ENGINEERING NEWS-RECORD

JANUARY 22, 1942

Above the line at right, this highway is unsatisfactory. Its performance is best during periods of

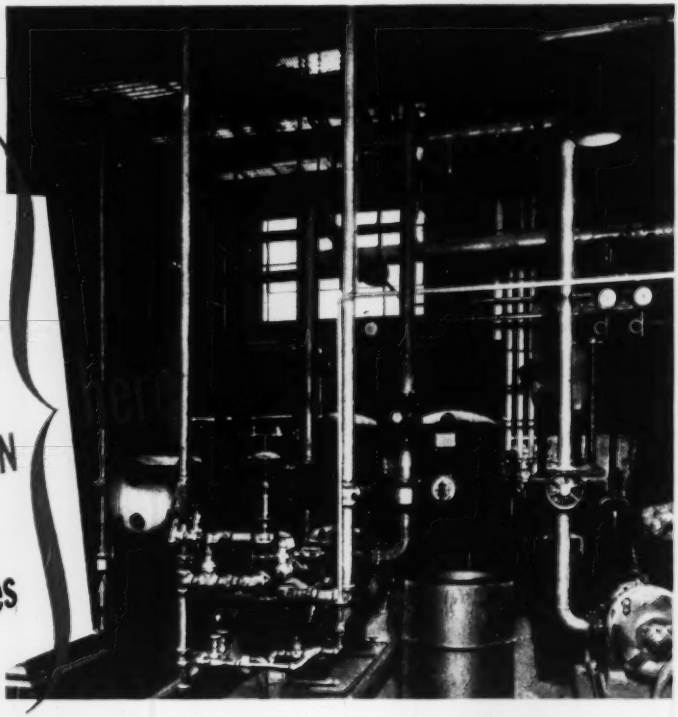
ARIZONA'S ANNUAL RATING SYSTEM FOR ROADS

•••

A PLAN FOR BETTER BUILDING CODES

A McGRAW-HILL PUBLICATION

For lower maintenance- BYERS WROUGHT IRON PIPE in 6 services



Specifications for boiler room piping not only determine what pipe shall be installed—but also determine how soon expensive failures will make re-installation necessary.

With maintenance costs as they are today, the pipe that lasts the longest invariably costs the least—and so, in the new power plant at Lawrenceville School, Lawrenceville, N.J., **maximum durability was a primary aim. In all water lines, all condensate lines, all return lines,** discharge lines, feed water lines to softeners and suction lines to boiler feed, Byers Wrought Iron pipe was installed. Stewart A. Jellett Co., Philadelphia, Pa., consulting engineers, were responsible for these sound specifications.

DEMONSTRATED PERFORMANCE

Every engineer will recognize the corrosion hazard that is present in each of these services. And many engineers, from all sections of the country, can certify from personal experience how effective wrought iron is in combating the conditions. In a number of reported cases, wrought iron has doubled, tripled and even quadrupled the useful life previously obtained from low-first-cost piping materials, and ended maintenance headaches that had been regarded as incurable.

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Wrought iron offers unique service qualities, because of its unique composition and structure. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and "detour" corrosive attack, thus discouraging pitting and local penetration. In addition, the fibers anchor the initial protective scale, which shields the underlying metal.

BOOKLET ON REQUEST

The best guide in applying wrought iron is not just a list of current uses, but an understanding of just what wrought iron is, how it is made, and why it resists corrosion. The story is condensed in the booklet, "The ABC's of Wrought Iron", which we will be happy to send you on request.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco. Export Division: New York, N. Y.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

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ENGINEERING NEWS-RECORD

VOLUME 142 JANUARY 20, 1949 NO. 3

WALDO G. BOWMAN
Editor

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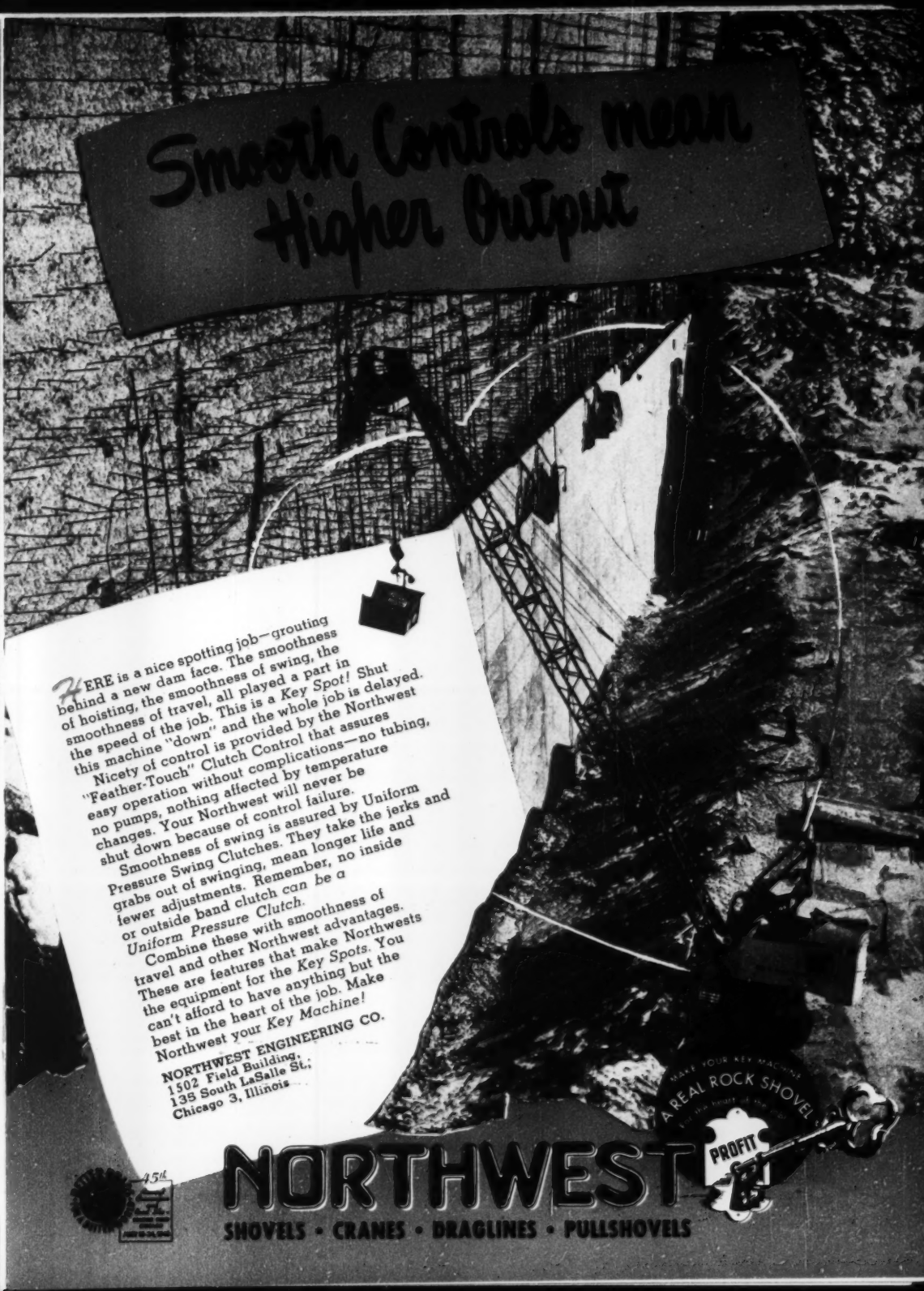
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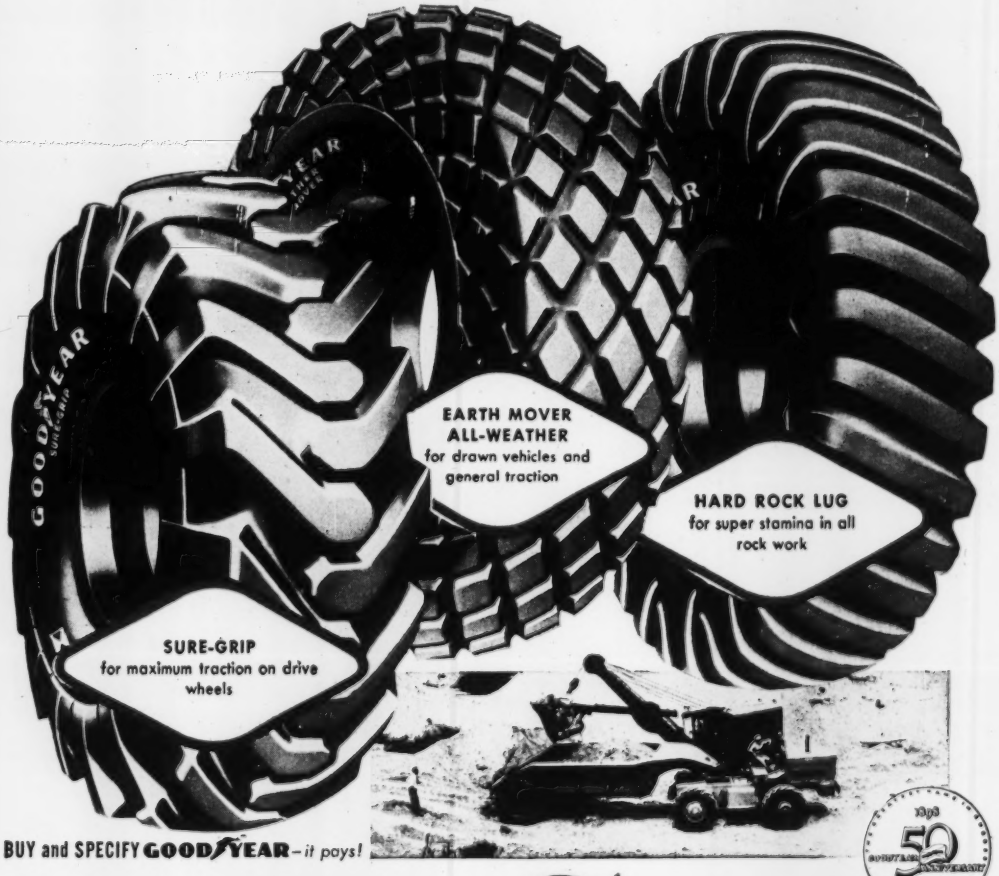

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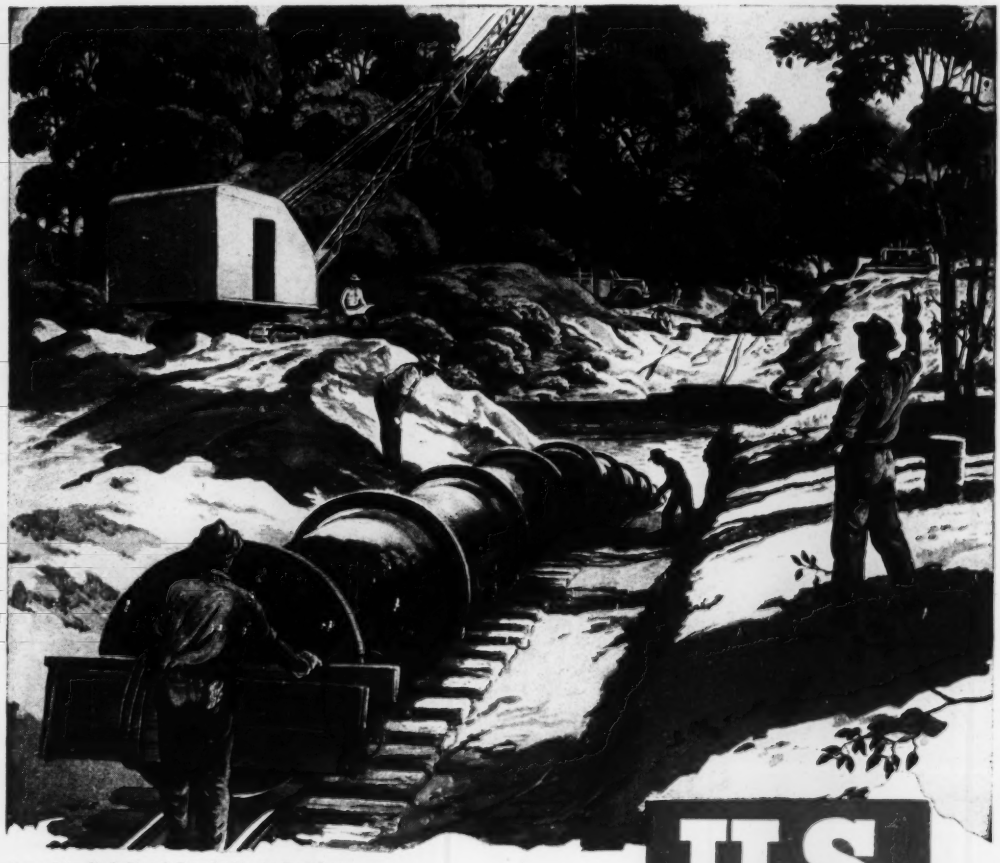

Painted for U. S. Pipe & Foundry Co. by Paul Laune

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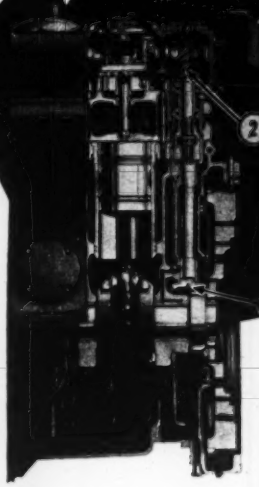
In the files of our Engineering Service Department that go back nearly half a century, are records of the solutions to unusual problems in pipe design and installation, such as the flexible joint stream crossing illustrated above. If you have such a problem we may be able to tell how a similiar problem was previously solved. Our wide design and manufacturing experience with special fittings to meet unusual requirements, where standard material cannot be used, may also be found of value to you. **United States Pipe and Foundry Co., General Offices: Burlington, New Jersey. Plants and Sales Offices Throughout U. S. A.**

Flywheel-end cam drive in MURPHY DIESELS

... means greater accuracy of timing control and longer gear life



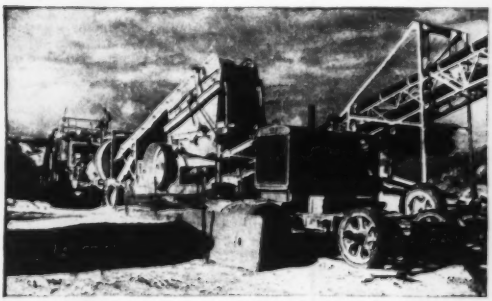
Section of the flywheel end of a Murphy Diesel. Drive for the cams is taken off the crankshaft at its point of smoothest rotation by means of a forged, case-hardened alloy steel bevel gear (1), the rotation is transmitted to the camshafts through a ball bearing mounted worm drive (2).

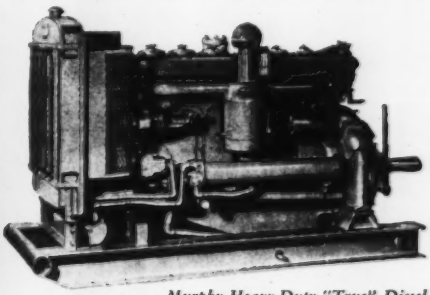
IN any engine the steadiest rotation of the crankshaft exists at the flywheel. By driving the camshafts from the flywheel end in Murphy Diesels, this uniform rotation is utilized rather than the uneven wear-producing rotation of the opposite end. The steady rotation of the flywheel end makes possible greater timing accuracy and longer drive life whereas the unsteady rotation of the other end imposes heavy loads on gear teeth and bearings causing rapid depreciation and wear and early, expensive replacement.

Flywheel-end cam drive is just one of several outstanding design features of Murphy Diesels. Others include "true" diesel operation, unit fuel injection, four valves per cylinder, dual overhead camshafts and hydraulic servo-type governor. Full details are given in the booklet *"7 Questions to Ask a Diesel Engine Salesman"*. Ask your Murphy Diesel Dealer for a copy or write to:

MURPHY DIESEL COMPANY
5311 West Burnham Street • Milwaukee 14, Wisconsin

Two Murphy Diesels power this rock crushing plant.





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MURPHY DIESEL

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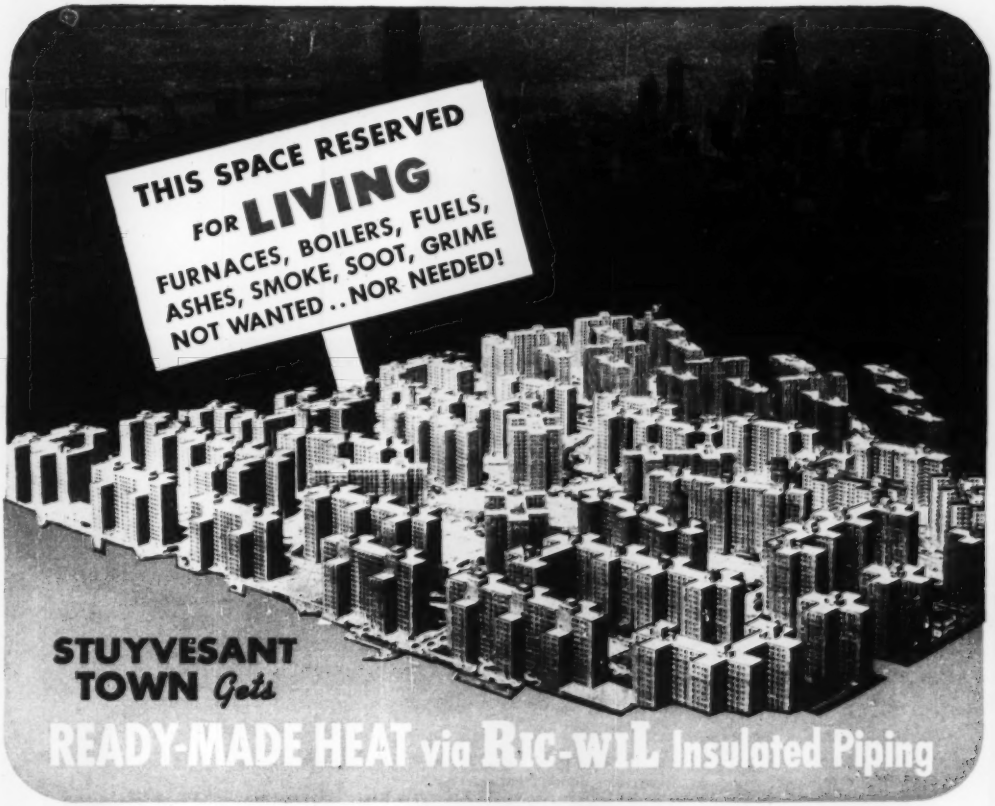

● Yes, everything's right here for the 32,700 people who are housed in this modern, mid-Manhattan community. That's the way the Metropolitan Life Insurance Company planned it.

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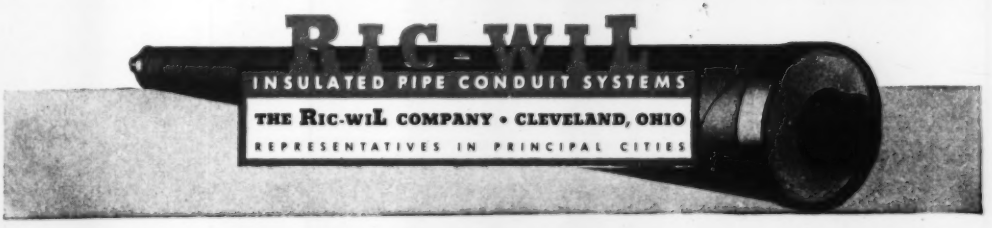

What He Says about KINKING

One of the quickest ways to ruin a wire rope is to let it kink. That, says the Bethlehem engineer, is certain death for the rope. Even though your eye may detect no damage . . . it's been done. For kinking throws wires and strands out of harmonious balance; leads to spot wear and wire breakage long before the rope has lived its normal life.

Improper unreeling is a common cause of destructive kinking. Never lay the reel on its side without a turntable and attempt to lift off the rope. That's just asking for trouble. Instead, jack up the reel so that it revolves freely; then, while one man "brakes" the reel, another should slowly pull off the rope in a straight line.

Be careful, too, when handling a *coil* of rope—one not wound on a reel. Merely grabbing the rope and starting to pull will invariably produce damaging loops and kinks. To uncoil, place the end of the rope on the ground, then roll the coil like a hoop, in as straight a line as possible.

The Bethlehem field engineer will gladly give any helpful pointers on the proper way to unreel and uncoil wire rope. It's something *every* user of rope should know.

Remember, there's no charge for the services of the Bethlehem representative, no matter how much time he spends with you. It's his job to help you in selecting wire rope and getting the best service from it. Feel free to call him on any wire-rope problem.

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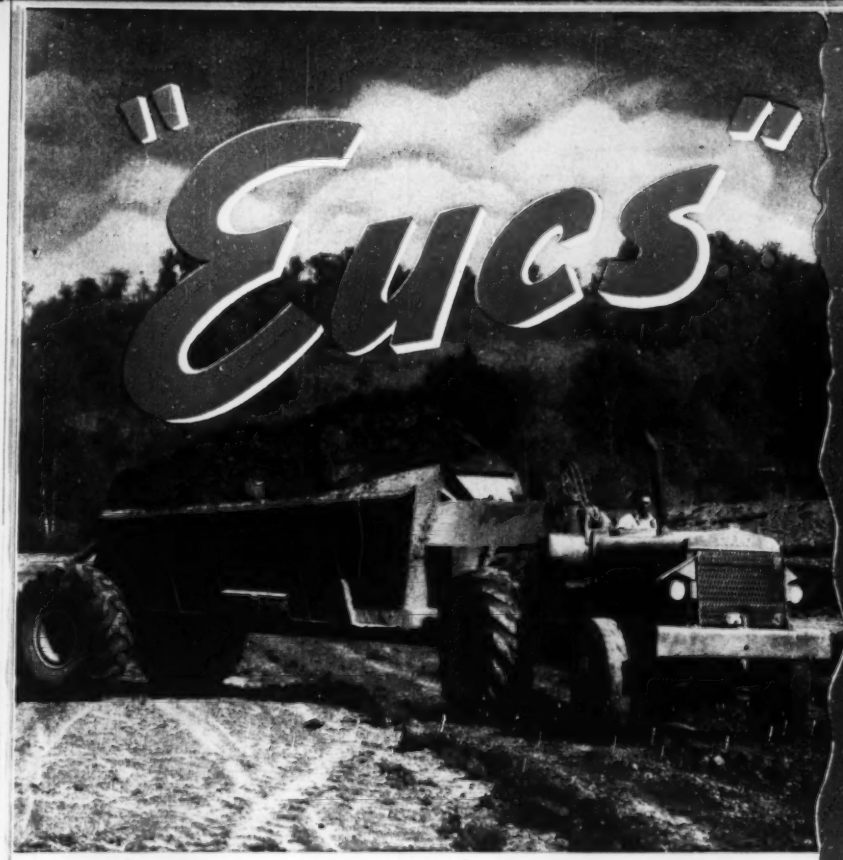

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For a complete explanation of the Exclusive Cummins Fuel System and how it can cut your fuel bills, write Cummins Engine Company, Inc., Columbus, Ind., for Bulletin 5275.

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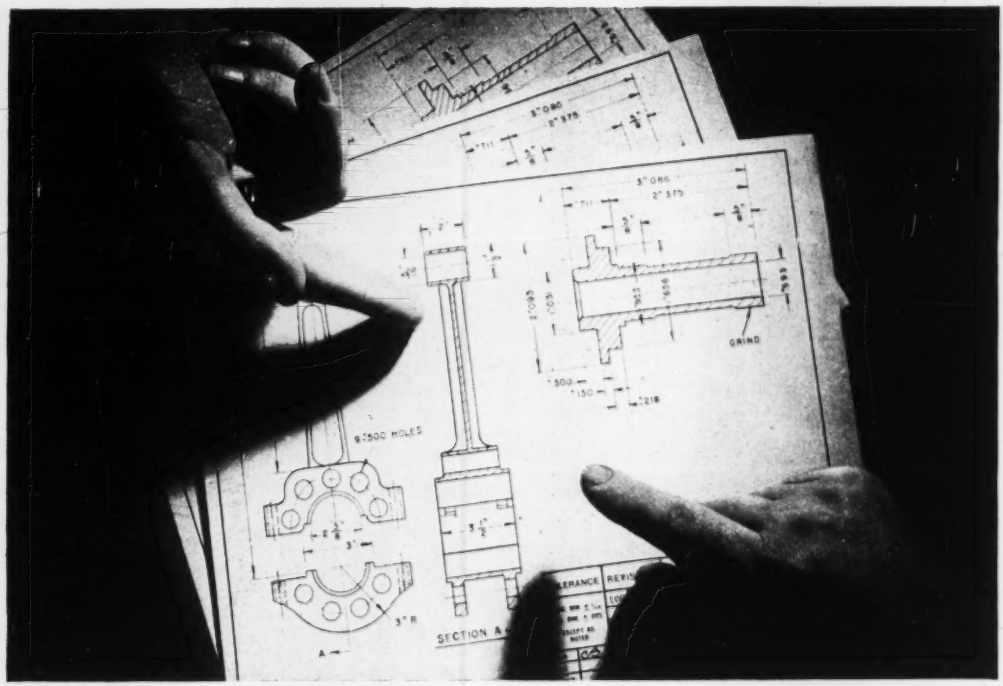

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HELIOS dry developed materials cover a wide field of reproduction needs. They consist of opaque papers (black, blue and maroon line) and opaque cloth for working prints, besides transparent papers and cloth and clear and matte films, for intermediate originals (to use instead of originals).

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picture of the engineer, the scientist and the draftsman in shaping the modern world

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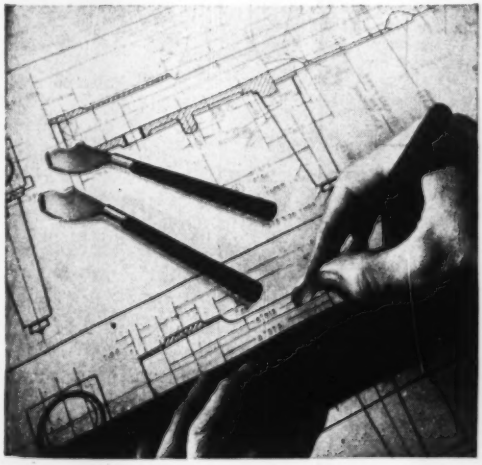
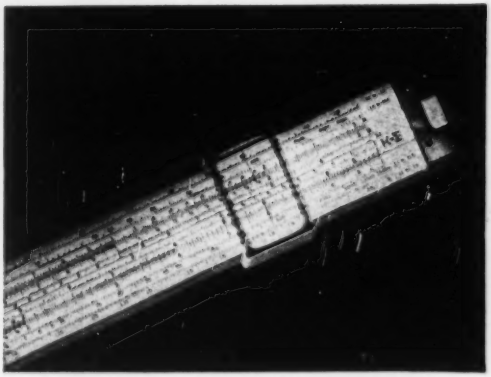
Ask your K&E Dealer or K&E Branch to show them to you.





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2-Cycle GM Diesel Engine

A CONSTRUCTION MACHINE THROUGH AND THROUGH

Handles every type of grading on road or street construction—builds ditches, cuts backslopes, removes sod, shapes up and finishes surface . . . scarifies, mixes blacktop, plows snow.

FAST, HIGHLY MANEUVERABLE

- Six Forward Speeds — 2.21 to 15.58 m.p.h. . . . Three Reverse — 2.64 to 5.74 m.p.h.
- Travel speeds smoothly synchronized with operator controls . . . all the needed power applied as required.
- Easier to steer and maneuver on every type of job — shorter turning radius makes it ideal for narrow roads and streets.

***OTHER ALLIS-CHALMERS DIESEL-POWERED MOTOR GRADERS**

AD-4, 104 Brake hp. . . . 22,140 lbs. AD-3, 78 Brake hp. . . . . 21,835 lbs.
BD-2, 50.5 Brake hp. . . . 17,772 lbs.

COMPLETELY EQUIPPED including electric starter and lights. Available with scarifier, cab and snowplow. Choice of 7:50, 9:00 or 13:00 front tires.

PATTERNED AFTER THE POPULAR MODEL AD MOTOR GRADER

STRONG — exclusive tubular frame . . . absorbs shocks, protects control rods inside frame.

ACCURATE — cuts smoothly, blade held firmly on road through direct down pressure.

HIGH CLEARANCE — 28" throat clearance for handling bigger windrows without interference.

"ROLL-AWAY" MOLDBOARD — less power required to handle bigger windrows at faster speeds. Material is rolled, not pushed.

FULL CIRCLE REVOLVING BLADE — swings 360° . . . enables operator to grade either forward or reverse.

FULL RANGE OF BLADE POSITIONS . . . plus leaning front wheels, for handling all types of grading with ease.

ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Take a tip from the

when your construction

This 40 cubic yard Dipper on the Marion Type 5561 Stripping Shovel will scoop up enough earth at one bite to fill a room 10 by 12 by 9 feet. Two dipperfuls would fill a railroad hopper car. If this mammoth shovel were placed in the middle of a typical city block it could reach over into the next block and dump its enormous load on top of a 7-story building.

What is even more amazing is the fact that this 40 cu. yd. dipper was installed on a machine which had formerly been handling a 35 cu. yd. dipper, and yet, even when fully loaded, the bigger dipper does not increase the front end weight.

This was accomplished by careful redesign and the use of new steels of unusually high strength which cleared the way for a dipper and handle design which is 30,000 lb. lighter than materials formerly used in achieving the same strength.

World's Biggest Dipper

requires strength far beyond the ordinary

New, superior-strength alloy steel—tough and readily welded—reduces weight of dipper and handle 30,000 lb. . . . and makes possible a 14% increase in shovel output.

If you are interested in the possibilities offered by *readily welded* steel plates that have far greater strength and toughness than low-alloy, hot-rolled steels, this story is for you.

Four years ago the engineers of the Marion Power Shovel Company came to us. They had a real problem. They were called upon to design and build a coal stripping shovel of greater capacity than the 35 cu. yd. size—largest in existence at the time—without increasing the front-end weight. What they wanted to know was: could we give them a steel that would have strength considerably beyond that available in the low-alloy, hot-rolled steels?—could it be welded and fabricated by conventional means?—could it be furnished in large plates?—could its cost be kept within economically practical limits?

The answer was "yes." After considerable research and testing, a copper-nickel-molybdenum steel that had been developed for gun mounts during the war was modified to fit the job. This steel has consistently shown a yield point in excess of 80,000 psi and tensile strength in excess of 100,000 psi, and has shown excellent weldability. In addition it has high impact strength, even at sub-zero temperatures. These properties lent themselves readily to Marion design, gave them almost 50% greater strength than obtainable formerly.

The steel was furnished in *heat-treated* plates, ¾" and 1¼" x 64" x 200". Used in the dipper handle in two U-shaped formed sections welded down the center of the sides, it reduced handle weight 25.5%. It was also used in sides and back of the dipper itself, which, although it is 14% larger than the former 35 cu. yd. dipper, weighs 10% less. The steel performed so successfully that it is now being used in *complete* dippers from 10 to 40 cu. yd. capacity.

We have gone into detail on this job because it so aptly illustrates two things:—first, the specialized metallurgical alertness and "know-how" that we can bring to any problem involving the use of alloy steels. And, second, our unequalled mill facilities for rolling, finishing and heat-treating that make it possible for us to supply alloy steel plates, in any analysis—in any size—in any heat treatment, to meet your requirements no matter how exacting. If your job demands the unusual in strength, abrasion resistance, durability, stamina, forming qualities—put it up to Carilloy Research.

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO,
PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE
DISTRIBUTORS, COAST TO COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

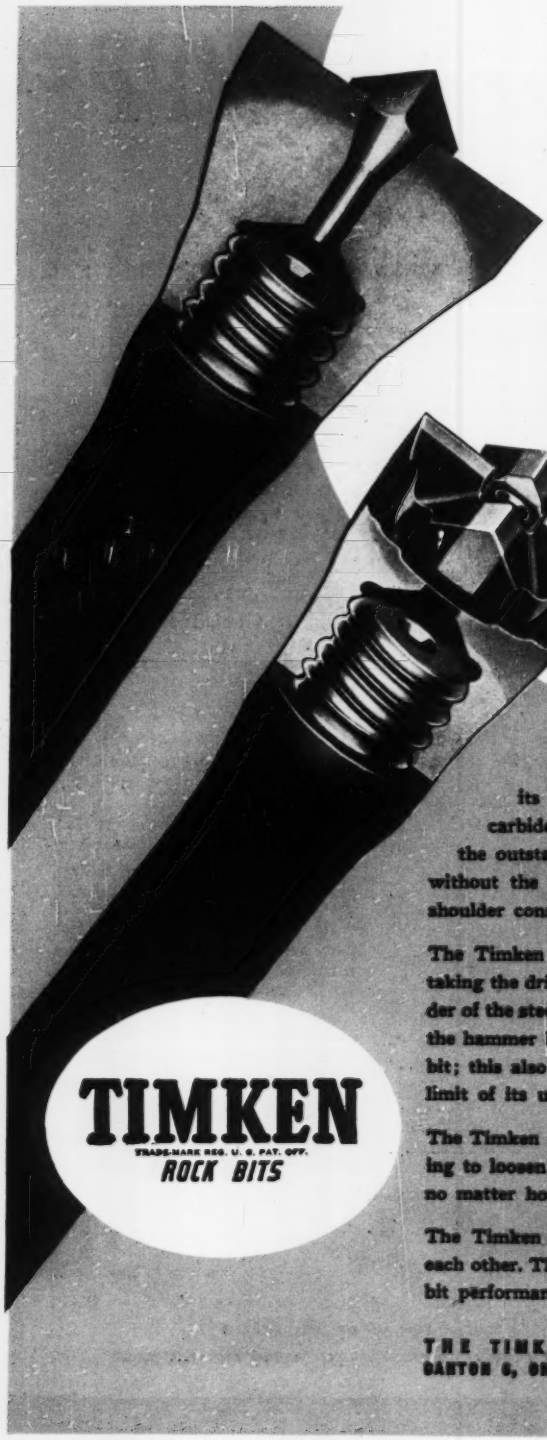
Carilloy Steels

USS

ELECTRIC FURNACE OR OPEN HEARTH

COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

UNITED STATES STEEL



Both need the right union for best results

No removable rock bit can be better than its union, whether it's deep-hardened steel or carbide insert. Even Timken bits would not yield the outstanding performance that is built into them without the Timken union with one-piece, solid steel shoulder construction; neither would they last as long.

The Timken union saves the bit and steel threads by taking the drill impact on the broad, flat machined shoulder of the steel. It increases drilling speed by distributing the hammer blows evenly over the cutting edges of the bit; this also enables the bit to retain its gauge to the limit of its useful life.

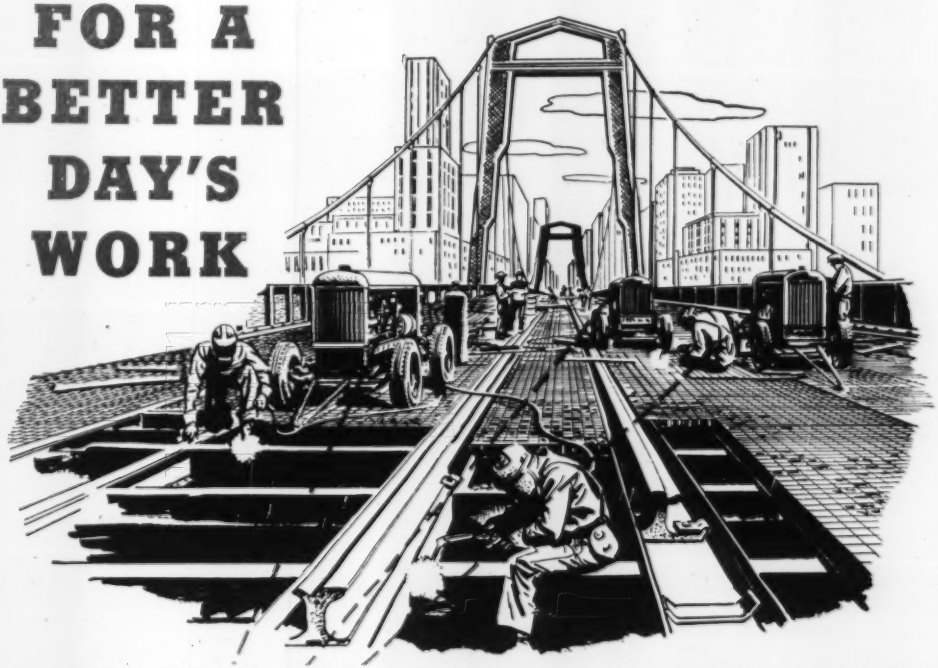
The Timken union is a single solid piece of steel—nothing to loosen up under the shock of the hammer blows no matter how hard the rock may be.

The Timken bit and the Timken union are made for each other. There is no other way to obtain Timken rock bit performance.

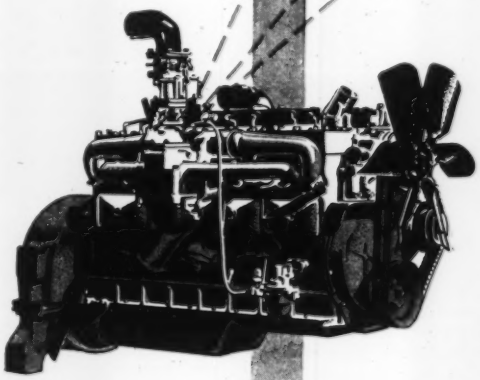
TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO • CABLE ADDRESS "TIMROSCO"

FOR A BETTER DAY'S WORK



ON THE HIGHWAYS – IN INDUSTRY – ON FARMS – IN OIL FIELDS – AND IN FORESTS!



Where metal is arc-welded to metal . . . in bridges, pipelines and other construction projects . . . Chrysler Industrial Power Units provide the most efficient, most economical power. Backed by 24 productive years of Chrysler Corporation engineering and technical skill, each engine and power unit is designed to deliver A Better Day's Work—is built to do the tough jobs in every field where gasoline engines are used. For complete information on the many engine sizes in the line and the wide range of horsepower ratings available, see your local Chrysler Industrial Engine dealer, or write . . .

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORP.
12200 E. JEFFERSON, DETROIT 31, MICHIGAN

NATION-WIDE SERVICE

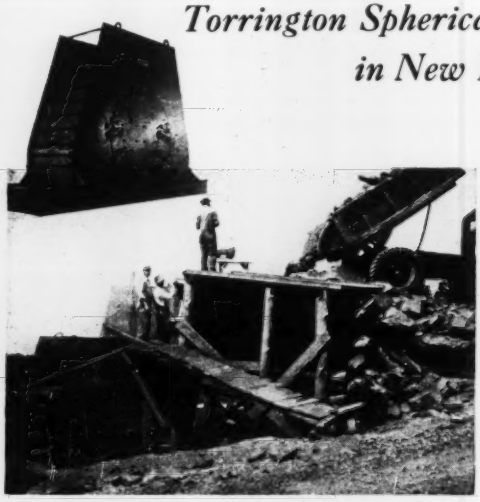
FACTORY-ENGINEERED AND TESTED PARTS WITH EXPERT MAINTENANCE WHEREVER YOU ARE

CHRYSLER

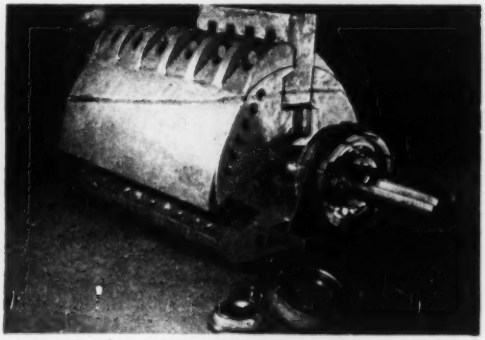
INDUSTRIAL ENGINES AND POWER UNITS

HORSEPOWER WITH A PEDIGREE

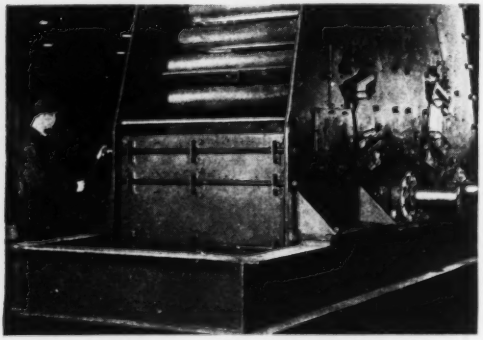
Two 6½-Ton Impellers Ride on Torrington Spherical Roller Bearings in New Holland Double Impeller Breaker



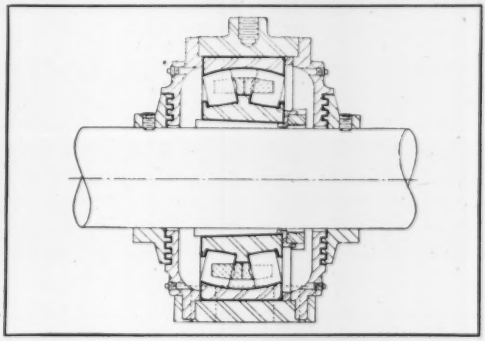
"Two immense rotating impellers are the business end of the Model 5050 Double Impeller Breaker," says Mr. Rollins of the New Holland Manufacturing Company. "Mounted for dependability on Torrington Spherical Roller Bearings, they crush 50-inch stones by a series of impacts applied in suspension."



Ease of assembly and accessibility is assured by the unit design of Spherical Roller Bearings and the simplicity of the pillow block mounting. The bearings carry the 13,400 pound dead weight of the impellers plus the heavy shock loads of operation with an ample margin of safety.



"One of the problems in the design of the Model 5050 Double Impeller Breaker," says Mr. Rollins, "was to secure proper alignment of the impellers on the massive welded frame. The self-aligning feature of Spherical Roller Bearings solved it for us, and there's no worry about shaft deflections in service."



Bearing clearances, vital for precise operation and long service life, can be accurately controlled by the adjustment of tapered sleeves, shown in the cross-section above. Axial stability of impeller shafts is provided by the two-direction thrust capacity of the Torrington Spherical Roller Bearings.

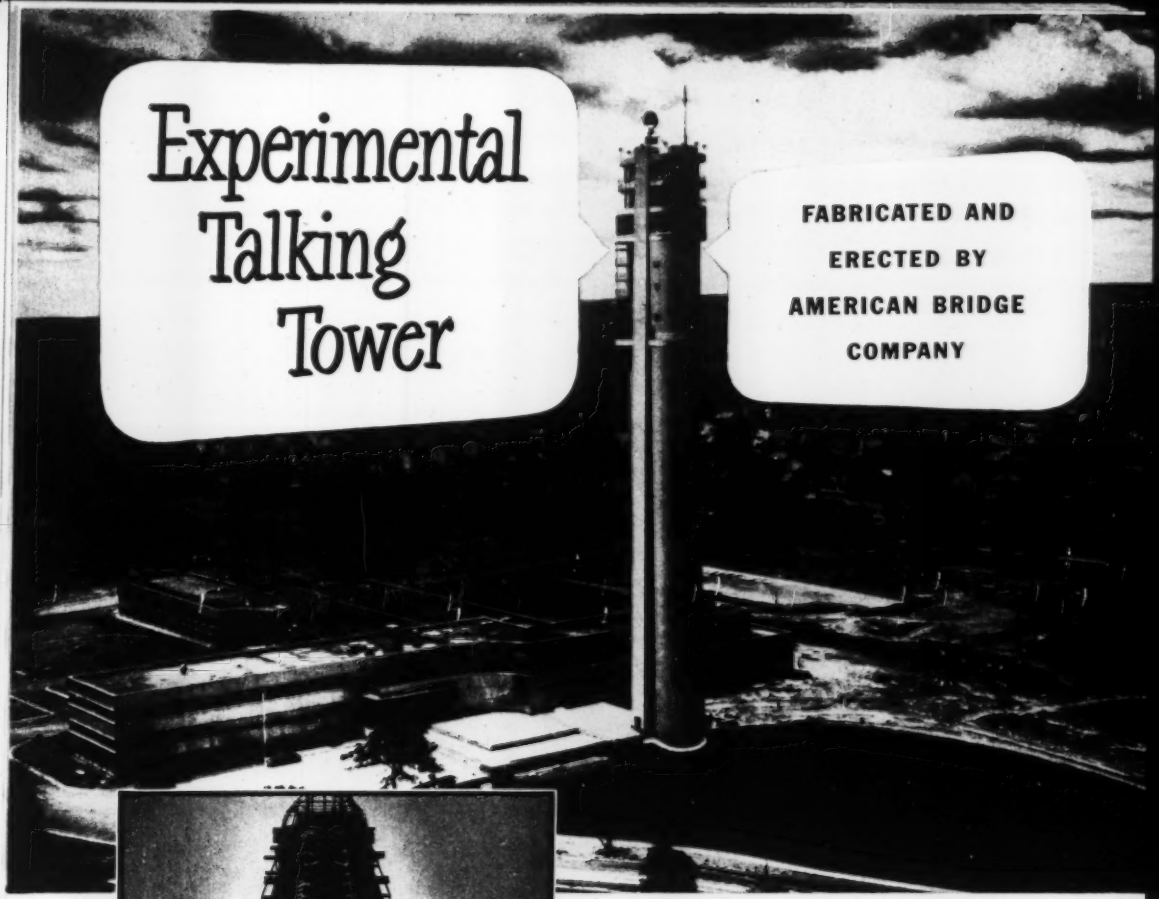
Heavy-duty construction equipment can be given a long lease on life with Torrington Spherical Roller Bearings. Torrington's engineers offer their specialized experience in this field to help solve your friction problems. Call or write the nearest Torrington office. THE TORRINGTON COMPANY, South Bend 21, Ind., Torrington, Conn. District offices and distributors in principal cities.

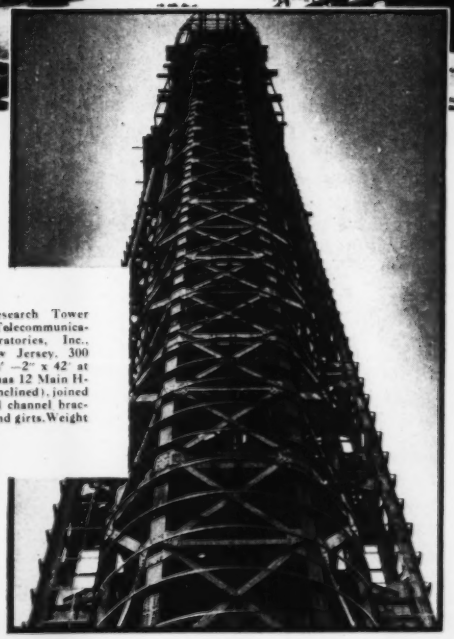
TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Straight Roller Needle • Ball • Needle Rollers

Experimental Talking Tower

FABRICATED AND ERECTED BY AMERICAN BRIDGE COMPANY





22-story Research Tower of Federal Telecommunications Laboratories, Inc., Nutley, New Jersey. 300 feet high, 38' -2" x 42' at the base, it has 12 Main H-Columns (4 inclined), joined by angle and channel bracing, beams and girts. Weight —760 tons.

View showing completed project. Laboratory buildings were erected for Federal Telecommunications Laboratories, Inc. Buildings 1 and 2 (in background) Louis S. Weeks, Architect—George A. Fuller, General Contractor. Buildings 3 and 4 and Tower (in the foreground) Giffels and Vallet, Inc., Engineers—L. Rossetti, Architect—George A. Fuller, General Contractor. All structural steel fabricated and erected by American Bridge Company.

● Improved television. Multi-channel communication links. FM mobile communications systems. Radar aids to aerial navigation. These are a few of the projects already begun in the research tower and laboratory buildings which American Bridge Company fabricated and erected for subsidiaries of International Telephone and Telegraph Corporation in Nutley, New Jersey.

The same care, the same service, the same knowledge American Bridge used on this and many other projects are available to you whatever the size or complexity of your structural or erection requirement.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

Contracting Offices in: BALTIMORE · BOSTON · CHICAGO · CINCINNATI · CLEVELAND DENVER · DETROIT · DULUTH · MINNEAPOLIS · NEW YORK · PHILADELPHIA · ST. LOUIS

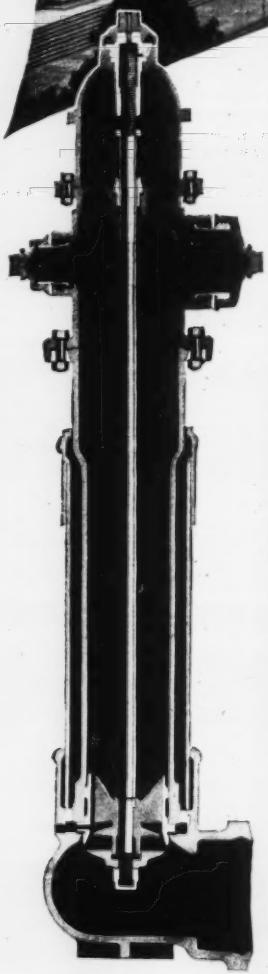
COLUMBIA STEEL COMPANY, San Francisco, Pacific Coast Distributors

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

AMERICAN BRIDGE

UNITED STATES STEEL



WILMINGTON, DEL.

"One of America's Safest Cities"
THE MATHEWS FIREMEN SAY

SIMPLE LOGIC! For Wilmington is protected by Mathews Modernized Hydrants, which means safety plus—for two big reasons. First, the hydrant need not be out of commission long in case of an accident. All the working parts are contained in a removable barrel which can be replaced in a few minutes without excavating.

Secondly, Mathews are designed for troublefree service—as generations of use have proved. Water cannot reach the thread and rust it. A shield operating nut, capping the revolving nut, keeps out rain and dust and provides free, quick action at all times. These and other features combine to make a hydrant in which there is just about *nothing to go wrong*.

The welfare of your community is your highest public interest. Send for descriptive literature and read in detail how the Mathews Modernized Hydrant can furnish the safety plus you are looking for.

OTHER MATHEWS FEATURES: Head can be turned 360° • Replaceable head, nozzle outlets easily changed • Nozzle levels raised or lowered without excavating • Protection case of "Sand-Spun" cast iron for strength, toughness, elasticity Operating thread only part to be lubricated • A modern barrel makes any Mathews Hydrant good as new • Low maintenance cost

MATHEWS HYDRANTS

Made by R. D. WOOD COMPANY

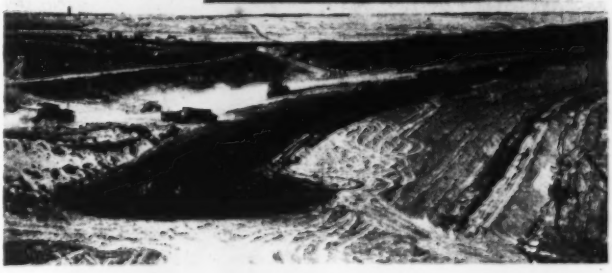
Public Ledger Bldg., Independence Square, Philadelphia 5, Pa.

Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds) and R. D. Wood Gate Valves

TOUGH JOBS MOVE FASTER

with GM DIESELS

Mammoth O'Sullivan Dam (formerly called Potholes Dam) took more than 9 million cu. yds. of earth and rock fill. Toughest hauls on this rugged project were assigned to 22 GM Diesel-powered Euclid bottom dumps in the fleet owned by contractors Lytle, Amis and Green. Six-mile round trips—with half the distance on an 8% grade—were completed in an average of 23 minutes, including loading time.



ALL OVER the country you see General Motors Series 71 2-cycle Diesels taking over the hard jobs and setting records for speedy completions.

In this case, on the 8% down-grade at O'Sullivan Dam, *braking capacity* of the engine was just as important to the contractors as "power at every downstroke." Full compression braking makes the GM Diesel powered "Eucs" easier on brakes and linings.

These 2-cycle Diesels also deliver high torque that gives trucks and tractors fast get-away and smooth up-grade pull even with a punishing load.

Add these advantages to their low fuel costs and their exceptional dependability, and you have some of the reasons contractors everywhere are saying, "We pick GM Diesels for our toughest assignments."

Before you specify power for any equipment, get all the facts. Call your local GM Diesel dealer, or write us direct.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES Up to 200 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS . . Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

THOR'S GREAT NEW

THE MOST POWERFUL 3/8" ELECTRIC IMPACT WRENCH EVER BUILT!

COMBINING TWO PROVED FEATURES!

The powerful, durable striking mechanism—of the same type so widely preferred in Thor *pneumatic* impact wrenches.

The famous Thor heavy duty electric motor . . . standard in Thor electric tools for 35 years.

See your Thor Distributor or Jobber today, or write for Circular No. 1025

INDEPENDENT PNEUMATIC TOOL COMPANY

Aurora, Illinois

Export Division: 330 West 42nd St., New York 18, N. Y.

Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Salt Lake City, Seattle, San Francisco, Toronto, Canada, Sao Paulo, Brazil, London, England

"PACKY"

A 1 2 PUNCH THAT DELIVERS EFFICIENCY FOR

NUT SETTING • SCREWDRIVING • DRILLING
IN STEEL, WOOD, MASONRY • TAPPING
REAMING • HOLE SAWING • SANDING

The complete versatility of this great new Thor tool makes it a "must" for every production line, factory maintenance, garages, engine rebuilding shops . . . *wherever* power can get jobs done cheaper—faster!

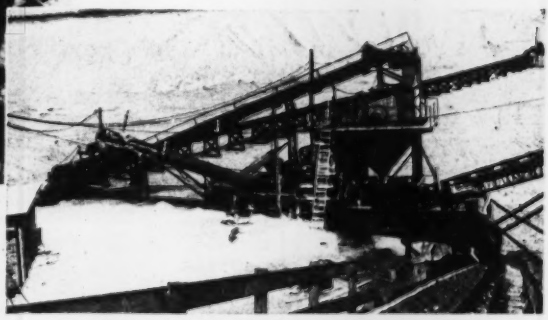
LEADER OF THE NEW THOR *Silver Line* ELECTRIC TOOLS

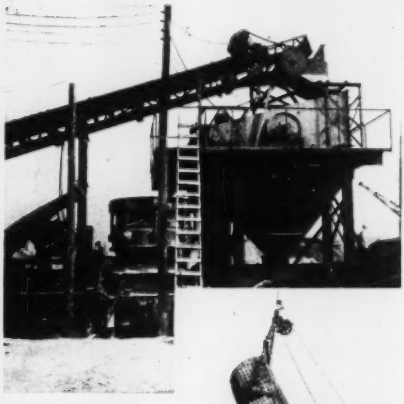
NOW 1/4", 3/8", 1/2" AND 1" DRILLS
NOW 4", 5", 6" PORTABLE SANDERS
NOW 3" AND 9" STANDARD AND HEAVY DUTY SANDERS
NOW 7" STANDARD AND HEAVY DUTY POLISHERS

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Foley Brothers like the capacity and dependability of their Telsmith Portable Plant.





The No. 48 Telsmith Standard Gyrasphere Crusher in closed circuit with 5′ x 12′ Telsmith 3-deck Pulsator, make up this portable plant's crushing-screening unit.

The portable feeder-hopper unit has a 36″ x 6′ Telsmith Heavy-Duty Plate Feeder.

every 15 minutes...

A 50-yd. CAR OF BALLAST!

AT FOLEY BROTHERS'

TELSMITH *Portable*

CRUSHING-SCREENING PLANT

• Turning out ballast for the C & NW Ry.—that's minus 1¼″ sand and gravel with oversize crushed and some sand eliminated—this Telsmith Portable Crushing-Screening-Loading Plant of Foley Brothers, near Algonquin, Ill., has a capacity of 2000 cu. yds. per 9½ hrs. They load a 50-yd. car in 15 minutes. The No. 48 Telsmith Standard Gyrasphere Crusher in closed circuit with a 5′ x 12′ Telsmith 3-deck Pulsator, and a 30″ x 70′ Telsmith steel truss Conveyor give the plant a compact, mobile crushing-screening unit of maximum capacity. Dependable, even flow is provided by the portable hopper-feeder unit with its 36″ x 6′ Telsmith Heavy-Duty Plate Feeder. Find out about Telsmith Portables with Gyrasphere Crushers in Bulletin P-2.

P-15

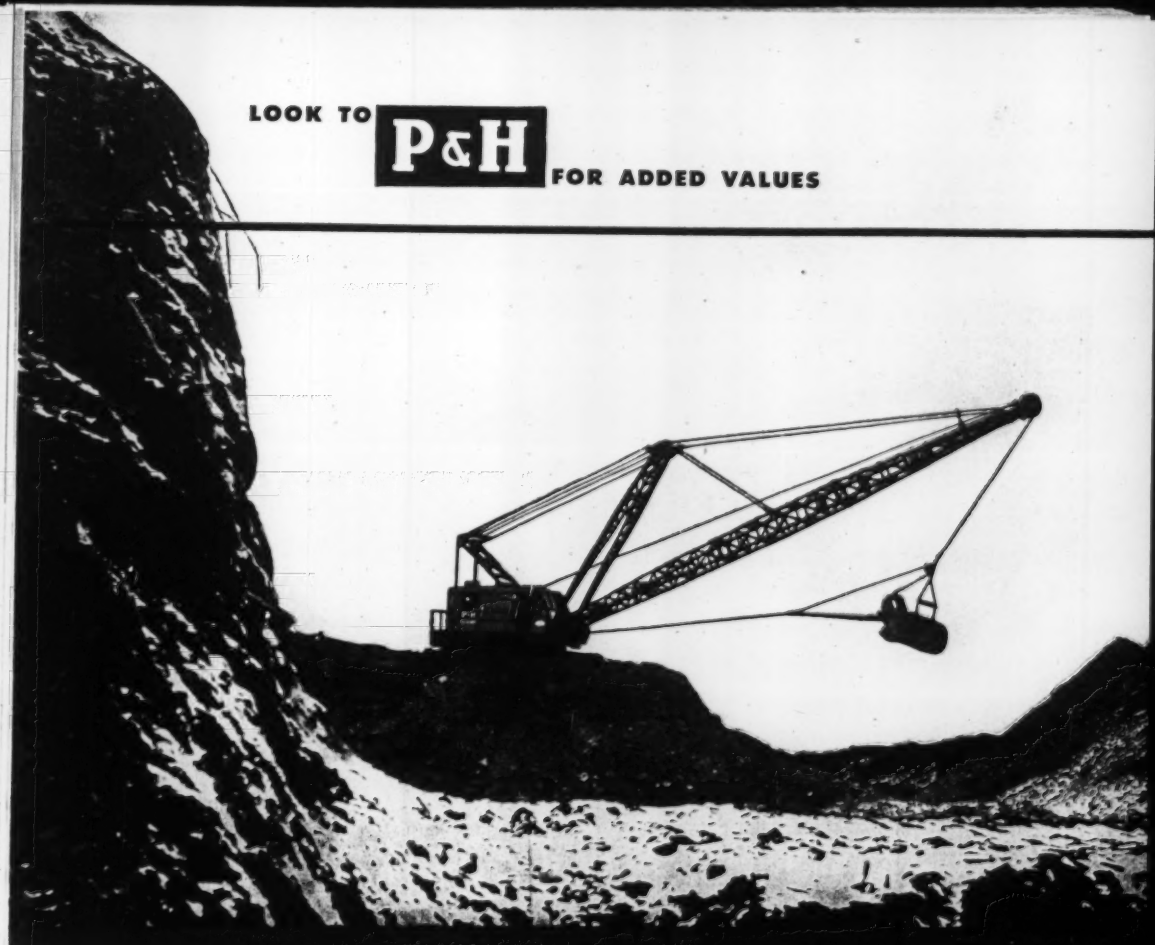
SMITH ENGINEERING WORKS, 500 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N.Y. • 211 W. Wacker Drive Chicago 6, Ill. • 713 Commercial Trust Bldg. Philadelphia 2, Pa. • 238 Main Street Cambridge 42, Mass. • Boehck Eqpt. Co. Milwaukee 3, Wis. • Brandeis Machinery & Supply Co. Louisville 8, Ky.

Rosbolt Equipment Co., Minneapolis 6, & Duluth, Minn. • Smith, Inc., Fargo, N. D. • J. D. Evans Equipment Co., Rapid City & Sioux Falls, S. D. • Rish Equipment Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 10, Va. • Wilson-Weesner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

LOOK TO **P&H** FOR ADDED VALUES

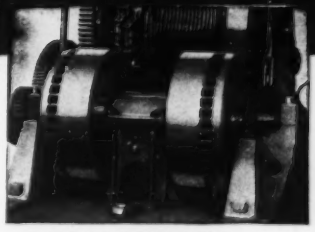


THE SWING'S THE THING!

And here's the kind of swing that's sweet music to production men on steady digging. It's the Magnetorque on P&H 1055 that transmits power for swinging—without mechanical contact—without wear—without time lost for clutch adjustments—without the high cost of lining replacements.

There's nothing to compare with the P&H Magnetorque swing—with its smooth, velvety action—with its simple construction.

If you haven't seen the 1055 in action, write us. We will gladly tell you where the nearest machine is located.



THE P&H MAGNETORQUE transmits power for swing electromagnetically — replaces swing frictions — eliminates the maintenance and repair work that goes with them. The Magnetorque unit will last the life of the machine.

P&H EXCAVATOR
4404 W. National Ave.
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

IF YOU CAN READ THE

(YOU'LL BE INTERESTED IN THIS AD)

THE one thing most contractors don't like about insurance *is having to pay for it!*

Now, we can't do away with payments but we can make those unpleasant premiums smaller and smaller and smaller (enough smallers!)

For instance: We helped an Alabama contractor to reduce his premium rates from 28.7% above the average for the field to 6.9% less than the average!

We helped a Virginia construction company reduce their premium rates to 33.2% below the average for the field!

And so on . . . We can show you dozens of cases where Dat Ole Debbil, Premium, was cut down to size . . .

That's part of our Specialized Engineering Construction Service. We help you reduce accident hazards and you don't pay as much for protection.

So you pocket the money . . . and you buy yourself a yacht and a good cigar!

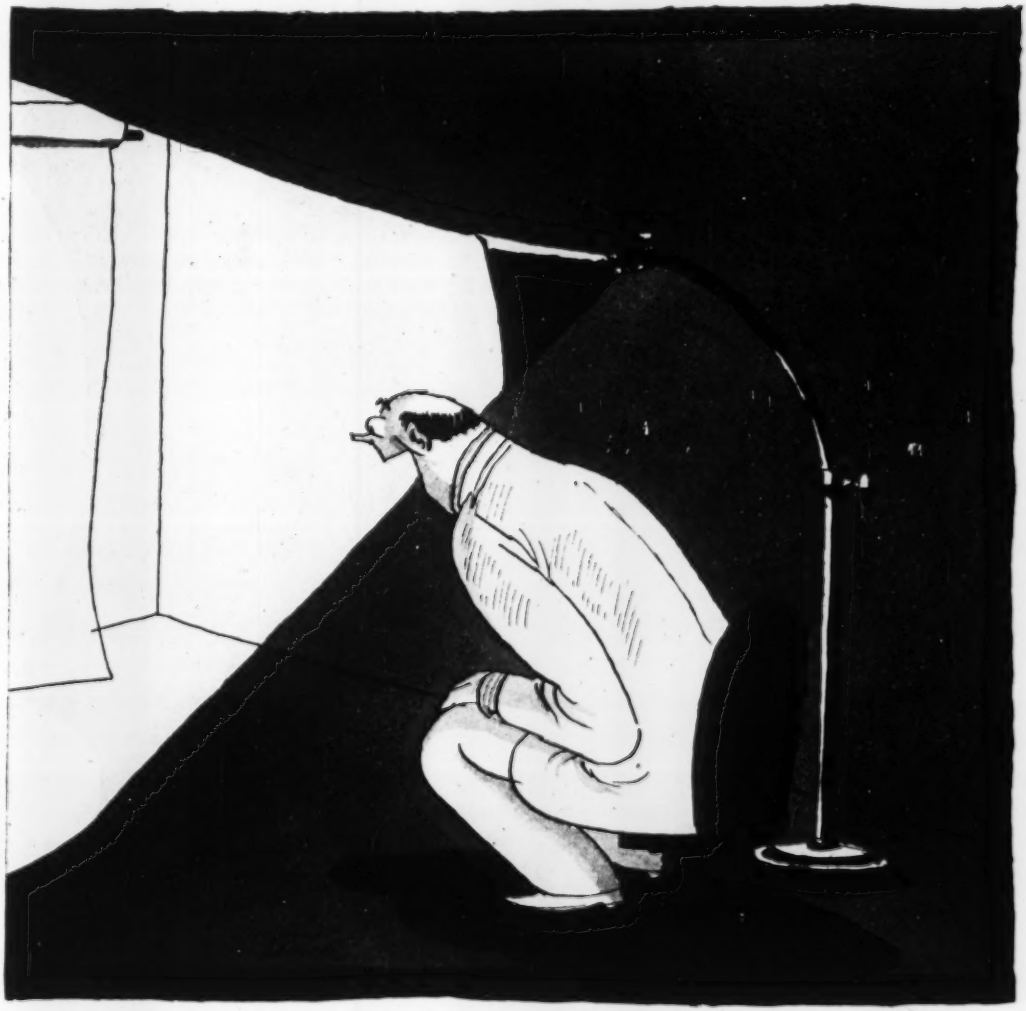
While we're helping reduce accidents and premiums, we show you ways to speed up work and cut down on lost time.

So you make more money . . . Have another yacht on us!

AMERICAN MUTUAL . . . *the first American liability insurance company*

© 1948 AMERICAN MUTUAL LIABILITY INSURANCE COMPANY

FIRST LINE . . . by Mr. Friendly



And all this service is included at no extra charge with every industrial policy.

But hold your breath! Here's the best part . . .

Despite rising costs (which you may have heard about), we still give you the chance to save 20% through dividends! . . . 20 cents on every insurance dollar.

That's money, mazuma, wampum, do-re-mi, sheckels, the green folding stuff... That's what we save you more of at American Mutual!

P.S. Why not send today for 2 free illustrated text books, "Surface Construction without Accidents" and "Foremanship and Accident Prevention in Construction."

MAIL THIS COUPON NOW — WITHOUT DELAY!

Dept. O-76, American Mutual Liability Insurance Co.
142 Berkeley St., Boston 16, Mass.

Without obligation, please *rush* to me more information on the All-American Plan, so that I may be richer and happier!

*Name*_____

*Street*_____

*City*_____ *State*_____

Tarps that Help Pay for Themselves

You'll like the way Mt. Vernon Extra cuts your tarp replacement costs. There's longer wear and extra protection with Mt. Vernon Extra even under the most punishing of service conditions.

Mt. Vernon Extra fabrics are made from top grades of cotton and produced under rigid laboratory controls to a high degree of uniformity that gives them longer life.

For tarps that mean extra wear and reduced replacement costs, specify Mt. Vernon Extra Duck.

Mt. Vernon-Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. • NEW YORK

Branch Offices: CHICAGO • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • AKRON

The NEW Truscon Series 46 DOUBLE-HUNG WINDOWS

(Spring-balanced)

trim, smart, streamlined

strong, sturdy, economical

Architects like its structural strength and architectural correctness . . . contractors like its ease of installation . . . owners like its streamlined beauty and low maintenance cost. Everyone likes its all-round *economy!*

The new Truscon Series 46 Double-Hung Steel Window is recommended for use on any project except when fire windows are specified and a counterweighted window is essential. Use of a spring balance in this new Truscon window eliminates the necessity of large weight boxes, and avoids the cost of field labor required to install cast iron counterweights and place the sash in accurate balance after glazing.

The spring balances are housed in the head member and the stainless steel suspension tapes are wholly concealed with the sash either open or closed. Positive weathering is provided by flexible spring-bronze strips attached to the sash at head, meeting rails, sill and jambs. Bonderized. Baked-on paint. Lever-type lift handles. Muntins as desired. Screens, storm sash and window cleaner anchors available.

New Literature. Send for new catalog complete with installation details and specifications on Truscon Steel Windows for every type of residential, commercial, industrial and institutional use.

TRUSCON STEEL COMPANY
YOUNGSTOWN 1, OHIO
Subsidiary of Republic Steel Corporation

Manufacturers of a Complete Line of Steel Windows and Mechanical Operators • Steel Joists • Metal Lath • Steeldeck Roofs • Reinforcing Steel • Industrial and Hangar Steel Doors • Bank Vault Reinforcing • Radio Towers • Bridge Floors.

BAKER
HD-5
BULLDOZER

SMALL BUT PLENTY *TOUGH*

Here's a rugged little bulldozing team that can really turn out a tremendous amount of work on any job. The HD-5 and Baker Bulldozer is small and compact, easily maneuvered, easily transported, easily operated. It's fast on its tracks, but packs a powerful punch when the going gets tough.

Direct hydraulic lift on the blade means faster action, more accurate control, and positive down pressure — for easier penetration in tough digging.

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There's no better bulldozing team in the 40 HP class. Try one on your next job and see the difference — compare performance, costs, output and you'll be way ahead with Baker. See your Baker Allis-Chalmers dealer today for delivery schedules.

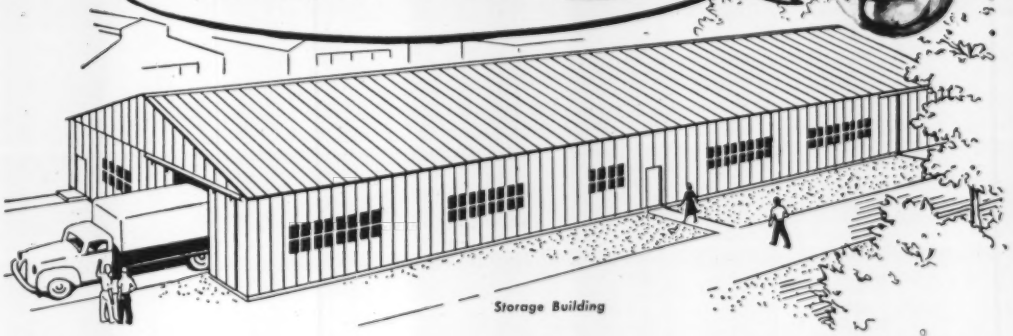
BAKER MFG. CO. SPRINGFIELD, ILL.

BAKER

BULLDOZERS • GRADE BUILDERS • SNOW-PLOWS

"I've Discovered a Low-Cost Steel Building that's Better YET SAVES MONEY 5*WAYS!"

Yes, I've Checked Them All and Find These Buildings Are Stronger, Easier Erected, and Available NOW!



Storage Building

When your industrial operations call for additional, quickly-erected storage and production space . . . look to STEELCRAFT Standardized Structural Parts and Sections! Unlimited arrangements . . . by adding to existing buildings, for separate buildings, or in combination with architecturally designed structures . . . are possible with STEELCRAFT Standardized Units.

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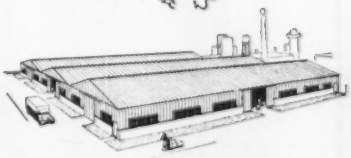

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1. Standardized, Yet Extremely Flexible to Meet Your Specific Requirements!
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☐ Please send engineer to survey my building requirements.

☐ Please send me information on complete line of Steelcraft All-Metal Buildings.

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FRYING TO FREEZING *in Two Hours*

Down "south of the border" a Mexican mining company has chiseled a road right through the heart of the Sierra Madre Mountains. Along its 74 tortuous, twisting miles, ore-laden trucks cross six mountain ranges. Elevations range from 600 to 11,000 feet and temperatures change from 110° to freezing.

GMC Diesels were chosen exclusively for this hazardous hauling job because of their ability to pull bigger pay loads than other engines of comparable size . . . because of their dependable, efficient operation at rapidly changing altitudes. All over America, other GMCs are performing many other different and difficult jobs with equal ease and efficiency.

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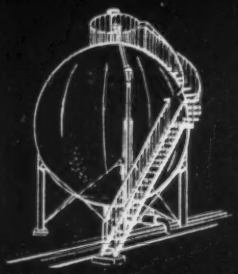
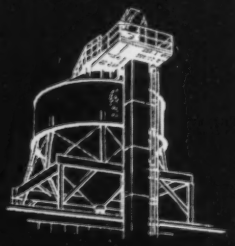
Heavy duty GMCs meet every construction hauling demand . . . with a choice of four gasoline and two Diesel engines . . . single speed, 2-speed, double reduction and tandem rear axles . . . weight ratings up to 90,000 pounds.

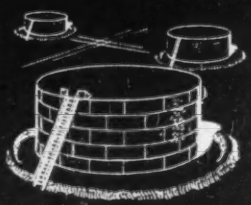
GMC TRUCKS

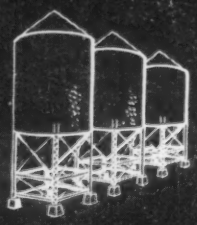
THE TRUCK OF VALUE

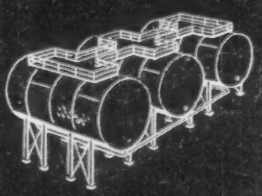
GASOLINE • DIESEL

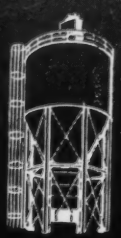












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YOUR MATERIALS STORAGE PROBLEM!

PITTSBURGH · DES MOINES Research

develop the answers for you

Finding the *right answers* to questions of efficient materials storage is a primary Pittsburgh-Des Moines activity.

Our research engineers, and our Chemical Storage Fellowship at Mellon Institute for Industrial Research, conduct a continuous program of study on storage problems from many fields, which is translated into better design, materials and methods by our fabricating divisions for the customer's benefit.

We will be glad to help with your own storage problem, if you will send us an outline of the factors involved.

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and Flanged Mountings

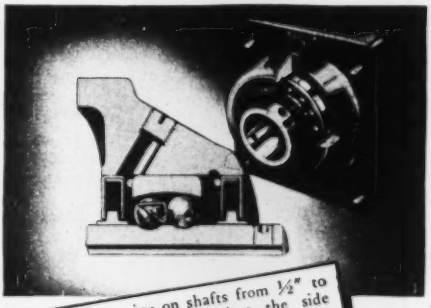
ROLL ALONG WITH SKF!

How many times have you asked: "What type of mounting shall I use where a pedestal support is not available, but where the housing must be attached to a surface at right angles to the shaft?"

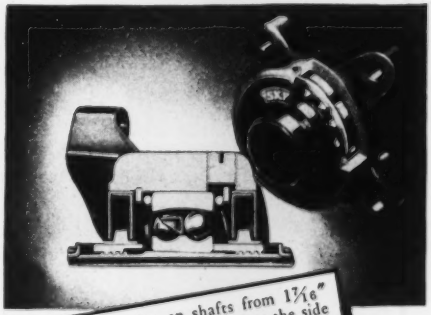
SKF provides the right answer with these compact Flanged Mountings that are packaged for immediate assembly. These mountings assure high capacity in a small space . . . are equipped with SKF Self-Aligning Ball Bearings and SKF's exclusive Align-O-Seal.

Remember, SKF *alone* makes a *complete* line of ball and roller bearings, pillow blocks, and flanged mountings. Write us for the address of your nearest Authorized SKF Distributor. 6532

SKF INDUSTRIES, INC., PHILA. 32, PA.



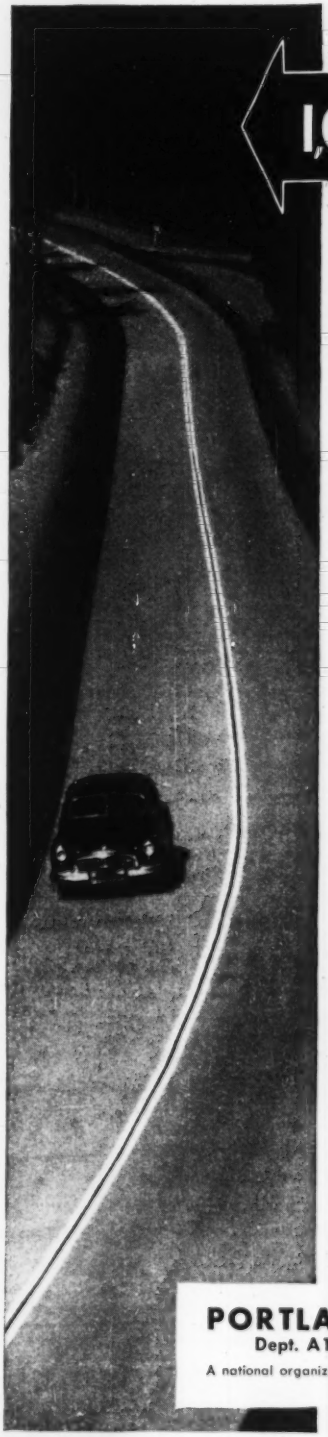
FUS For mounting on shafts from ½" to 1¼" in diameter against the side frame. Equipped with SKF Self-Aligning Ball Bearing and SKF Align-O-Seal. Top plug for periodic lubrication.



FUA For mounting on shafts from 1 1/16" to 2 7/16" in diameter against the side frame. Spider flange construction permits access to extended sleeve nut for quick removal . . . allows free air flow around bearing housing.

● *TYPE FUAR when equipped with SKF Spherical Roller Bearing.*

SKF
PILLOW BLOCKS



For

1,000 *or* 100,000

vehicles a day...

CONCRETE

is the economy pavement

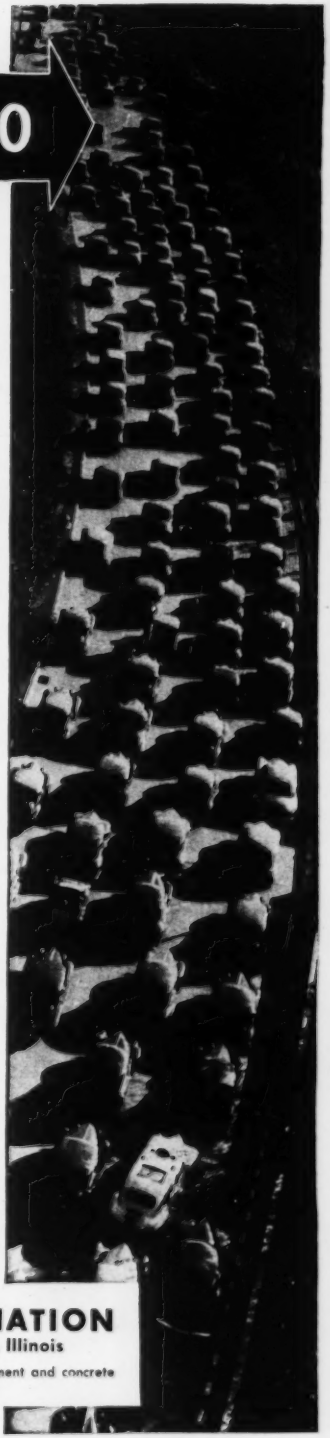
Whether a pavement carries 1,000 or 100,000 vehicles a day it will cost taxpayers less per year if it is built with concrete.

Concrete pavement can be designed for any anticipated traffic loads and volumes. Whatever the traffic conditions, properly designed concrete roads will be ***low-annual-cost*** pavements because concrete: (1) costs less to build than other pavements of equal load-carrying capacity, (2) has the strength and stamina to render long years of uninterrupted service and (3) maintenance costs are low.

Maintenance costs are so often the key to paving programs because as maintenance costs increase, less and less of the paving budget is available for new roads and for improving existing highways. That's why it is so important to build pavements with proved low maintenance costs.

Official records of 28 State Highway Departments, averaging 16 consecutive years and covering maintenance costs on 215,166.2 miles of highways, prove that *concrete costs less to maintain than any other type of pavement.* This is particularly significant because concrete highways usually carry the largest volumes of heavy vehicles.

For more information on how to design ***low-annual-cost*** concrete highways for any traffic conditions write for a free copy of "*Concrete Pavement Design*," distributed only in the United States and Canada.



PORTLAND CEMENT ASSOCIATION

Dept. A1c-17, 33 W. Grand Avenue, Chicago 10, Illinois

A national organization to extend and improve the uses of portland cement and concrete through scientific research and engineering field work

INTERCHANGEABLE PARTS

ELIMINATE MATCH-MARKING

ON CHAPMAN SLUICE GATES

Installation is quicker . . . maintenance easier . . . when you specify Chapman Sluice Gates. Because all parts are completely interchangeable there is no need for match-marking. Field replacement and repair is faster with never a worry about time-consuming alterations.

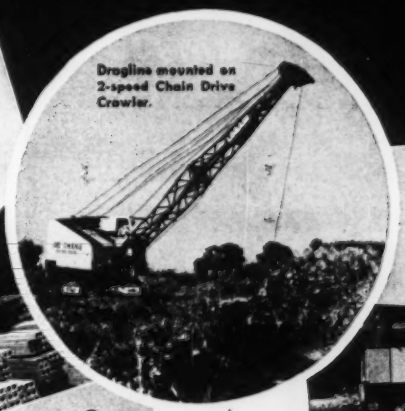
What's more, Chapman Sluice Gates can be equipped with any type of operating control — manual, hydraulic cylinder or motor unit. The totally enclosed, weatherproof motor unit is wired at the factory and installation is simply a matter of connecting the power leads.

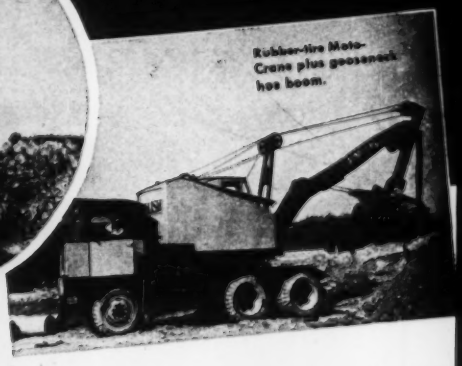
Write today for your copy of Chapman's Sluice Gate Handbook.

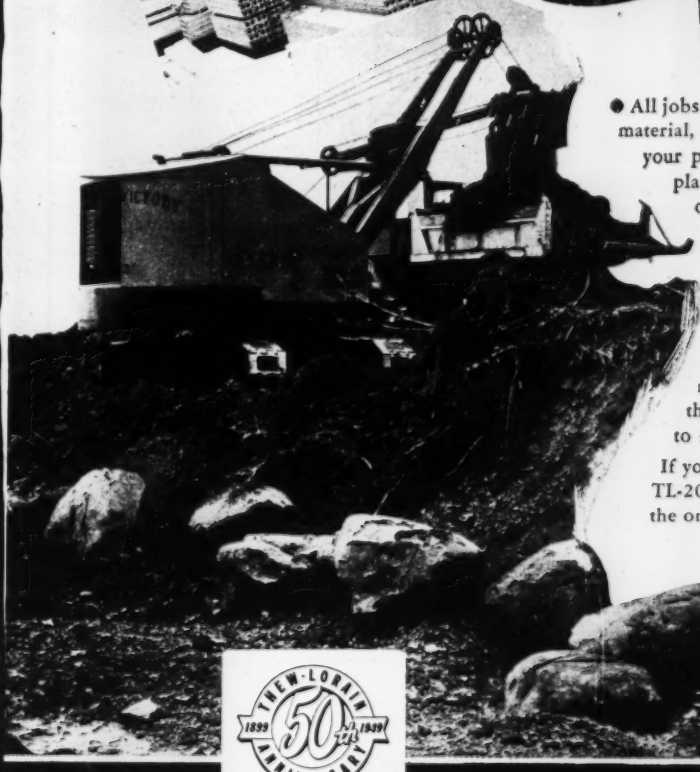
THE CHAPMAN VALVE MANUFACTURING CO.

INDIAN ORCHARD, MASSACHUSETTS

The TL·20 offers 50 combinations and 1000 profit possibilities







● All jobs are not the same; they vary in conditions, size, material, ground or travel conditions. It's important to your profits to have the right machine in the right place at the right time. That's why the selection of a Lorain TL-20 for today's job is your protection against tomorrow's ever-changing requirements.

With the TL-20 you have the choice of 50 working combinations—10 mountings and 5 interchangeable booms. And, remember, every one is a flexible combination. You can not only switch booms in a jiffy but because of the TL-20's modern Unit Assembly it's possible to interchange mountings as well.

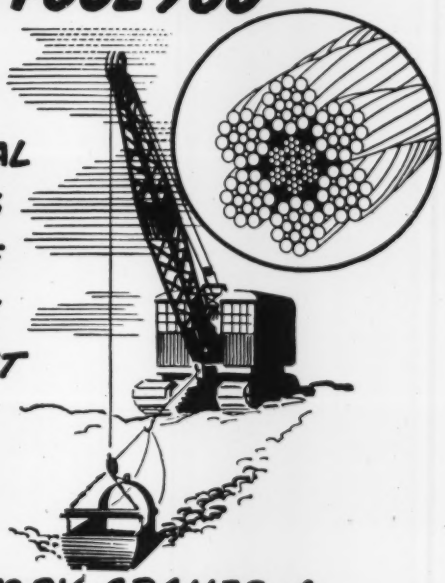
If you're one to plan ahead, plan now to see the TL-20 at your local Thew-Lorain distributor. It's the one high production unit in the ½ yd. class that can fit itself to both today's jobs and those of the future.

THE THEW SHOVEL COMPANY
Lorain, Ohio

THEW-LORAIN 50th ANNIVERSARY 1899 1949

Lorain Thew TL 20 Lorain

SOME ROPES FOOL YOU



U-W 6×16 FILLER WIRE IS IDEAL FOR DRAG CABLES ON DRAG LINE EXCAVATORS BECAUSE IT IS SUFFICIENTLY FLEXIBLE AND ABRASION RESISTANT

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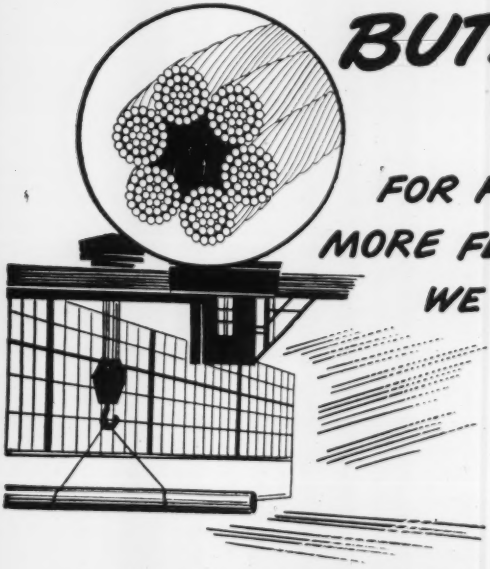

FOR FACTORY CRANES A MORE FLEXIBLE ROPE IS BETTER WE RECOMMEND U-W 6×37 CONSTRUCTION FOR THIS PURPOSE

For longest and best service, always specify
U-W LAYRITE (*Preformed*) **IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs.

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Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth
Main Offices and Factory: Cleveland 13, Ohio

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Economical operation at full or partial load.

Built to take a beating

CP Sinker Drill at Benson Mines, Star Lake, N.Y. Photograph through courtesy of Jones & Laughlin Steel Corp.

No priming is necessary with CP Sump Pump.

CP compressors, drills, demolition tools, vibrators, tampers, clay diggers, sheeting drivers, impact wrenches, etc., stand up on tough jobs because of their simplicity of design and sturdy construction. Write for a copy of SP-2083.

15% to 35% fuel savings is an outstanding feature of CP Portable Compressors, thanks to the CP gradual speed regulator—that adjusts engine speed exactly to air demands—and other CP features. Gasoline-driven portables range from 60 to 315 c.f.m. actual capacity; Diesel-driven, from 105 to 500 c.f.m. Illustrated is the Diesel-driven CP-500.

You'll find just the right sinker in the complete CP line of Sinker Drills, ranging from the light CP-14 (14-pound) to the heavy-duty CP-60N (119-pound).

To remove water from manholes, ditches, tanks, pits, CP Pneumatic Sump Pumps are the answer. Just turn on the air, lower the sturdy pump into the water, and pumping starts immediately.

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PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
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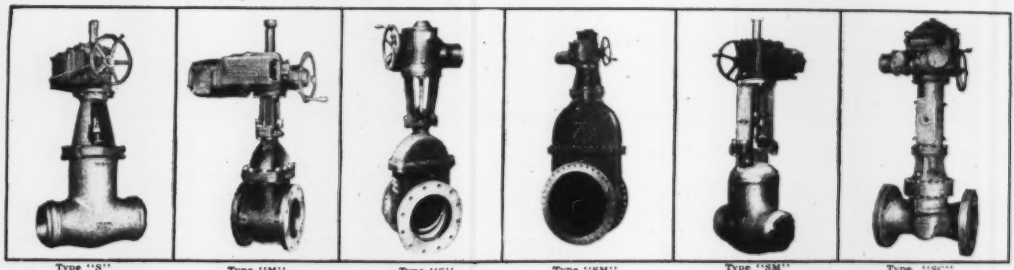


Type "S" LimiTorque on Crane Pressure-Seal Valve

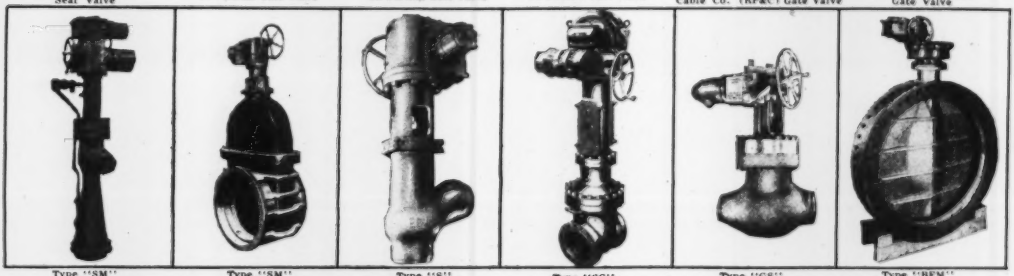
Type "M" LimiTorque on Jenkins Gate Valve

Type "S" LimiTorque on Darling Gate Valve

Type "SM" LimiTorque on Ludlow Gate Valve

Type "SM" LimiTorque on American Chain & Cable Co. (RP&C) Gate Valve

Type "SC" LimiTorque on Crane Venturi Gate Valve



Type "SM" LimiTorque on Schutte & Koerting Reducing Valve

Type "SM" LimiTorque on Rennselaer Inside Screw Gate Valve

Type "S" LimiTorque on Edward Angle Valve

Type "SC" LimiTorque on Powell Gate Valve

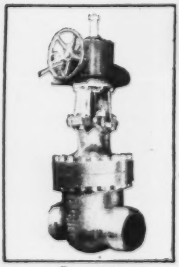
Type "GS" LimiTorque on Edward Boiler Non-Return Valve

Type "BFM" LimiTorque on Phillips (Henry Pratt Co.) Butterfly Valve

Types "S" & "M" LimiTorque on R-S Butterfly Valve (in tandem operation)

Type "SM" LimiTorque on Chapman 30" & 36" Gate Valves

Type "M" LimiTorque on 24" Iowa Gate Valve



Type "S" LimiTorque on Walworth Valve

Limitorque

MOTOR-OPERATED VALVE CONTROLS

. . . are widely used on many different makes of valves

"LimiTorque" operates by the "push of a button," from either remote or nearby control panel . . . prevents damage to stem, seat, disc, gate or plug, because the Torque Seating Switch limits the torque, and thereby, shuts-off the motor, *before* trouble can occur. Thousands are in daily use on land and sea.

LimiTorque Controls may be obtained through Valve Manufacturers.

There's a Reason for Such Widespread Acceptance

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Industrial Gears and Speed Reducers
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DRIVING MILES OF PILES

McKiernan-Terry No. S-5 Single-Acting Pile Hammer driving steel H-beams and wood piles for bulkheads and piers to berth de-activated naval vessels at Green Cove Springs, Florida. McKiernan-Terry Double-Acting Hammers No. 10-B-3 and 11-B-3 (not shown in photos) were also used. *Merritt-Chapman & Scott Corp., contractor.*

To provide a home port for 554 de-activated U. S. Navy ships of the Florida Group, Atlantic Reserve Fleet, required building a long sheetpile bulkhead and eleven 1,845-foot steel and concrete piers—totalling more than four linear miles of construction.

9,990 steel H-beams and over 10,000 batter and vertical timber piles had to be driven. For this big job, McKiernan-Terry Hammers—two S-5 Single-Acting and 10-B-3 and 11-B-3 Double-Acting—were the contractor's choice. . . . a choice based on years of dependable experience with McKiernan-Terry Hammers on difficult projects of every type.

In the McKiernan-Terry line of hammers, engineers and contractors can always find a standard size exactly suited to any specified requirements. A choice of ten sizes in double-acting hammers, five single-acting hammers and two double-acting pile extractors.

Other McKiernan-Terry Activities

McKiernan-Terry quality and engineering excellence are also found in coal and ore bridges, bulk material unloaders, marine equipment and other large engineering structures performing important service to industry, railroads and our government.

FOR MORE INFORMATION

Free literature listing specifications and advantages of McKiernan-Terry Pile Hammers and Extractors will be sent you on request. Write now.

McKIERNAN-TERRY CORPORATION, Manufacturing Engineers, 13 PARK ROW, NEW YORK 7, N. Y.

MK-247

McKiernan-Terry PILE HAMMERS AND EXTRACTORS

They dish out 32-ton bites ... from scoop to nuts!

IN AN EFFICIENT strip mining operation, coal-flow schedules don't allow waste motion.

From the time coal is scooped from near-surface veins until it is washed and graded down through "nut" size in the tipple, every move counts.

That's why you see giant Internationals working here.

Their job is to keep coal scuttling, in 32-ton loads, from massive shovels to final processing. And how they do it!

If you think you see an application to *your* job, listen to this: International W models were originally developed to tote timber in rugged western areas. They are now being used in oil fields, mining, heavy construction and other operations where powerful, *specialized* trucks deliver advantages you can't get any other way.

And like all International Trucks, "specialized" is the middle name of these big "W" brutes. They range from 30,000 to 90,000 pounds gross weight rating. Diesel, gas and butane engines are available, as are other components necessary to specialize these giants for your job.

Of course there are lots of other details you'll want to check to find out how profitably these massive-muscled bruisers can work for you. Just call your nearest International Truck Dealer or Branch; you'll get the facts, fast.

Other International Harvester Products . . . Industrial Power
Farmall Tractors and Machines . . . Refrigeration

Tune in James Melton and "Harvest of Stars," CBS, Wednesday Evenings

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Another Big Housing Project Specifies.
300 HOMES INSTALL CLAY PIPE SEWERAGE SYSTEM
The new 300-home Byrne-Moline Communities Housing Project at Moline, Illinois, selected Vitrified Clay Pipe exclusively for all its sanitary sewers. The over-all job includes 49,300 feet of Clay Pipe. This new housing is a project of Byrne-Moline, Inc., and is under the supervision of William M. Coopman, Moline City Engineer.

Vitrified Clay Pipe 100%

Vitrified Clay Pipe is chemically inert throughout because it is made of nature's own basic material. Through and through it is the same long-lasting clay, *heat-bonded at fusing temperatures* into a strong, permanent pipe that never wears out! Clay Pipe is rust-proof, corrosion-proof, and acid-proof . . . needs no paints or other coating to protect it from the action of corrosive soils, water, or the chemical action of waste materials.

Write for Information on Your Clay Pipe Question

NATIONAL CLAY PIPE MANUFACTURERS, INC.

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Vitrified CLAY PIPE

CLAY PIPE NEVER WEARS OUT!

C-1147-36

For heavy concrete breaking, BARCO MODEL H-6B

No Job too Big or Small for BARCO

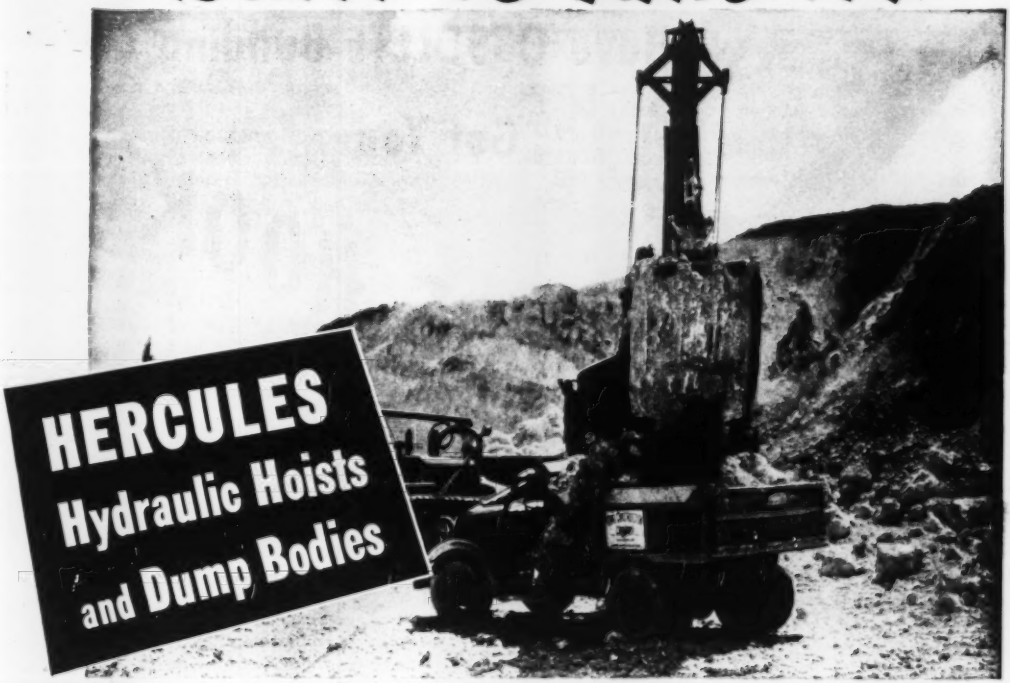
FOR heavy concrete breaking and backfill tamping, the Barco Hammer (H-6B) is unbeatable. Its portability means easier handling, plus the ability to get jobs done in difficult or hard-to-reach spots. Barco is packed full of power, deals a smashing battering attack that never slackens no matter how tough the going. And as for profit, Barco's mechanized muscles do more work at lower cost. For lighter work, especially frost breaking, use Barco Hammer (J-2). Write Barco Manufacturing Company, 1814 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

For breaking medium and light concrete, and hard or frozen ground, BARCO MODEL J-2

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO PORTABLE HAMMERS • BREAKING · DRILLING DRIVING · TAMPING

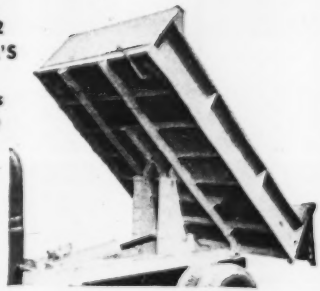
Built to take it!



Built to slug it out on the toughest jobs, Hercules Hydraulic Hoists and Dump Bodies are engineered to provide dependable, economical performance that pays off in profitable operation. Hercules "Center-Lift" Hoists are scientifically designed for maximum lifting capacity, precision-built for smooth, easy operation. And Hercules Dump Bodies, built for the hard usage that's part of any construction job, can take the toughest punishment and come back for more.

If you're up against a difficult hauling and dumping assignment, you'll want to learn more about Hercules Hoists and Bodies . . . built to take it . . . and built to give you the low-cost, maintenance-free performance that means profitable operation. Complete specifications are available without obligation; write today for Bulletin 1-48—your free copy will be sent by return mail.

HERCULES MODEL D-12 CONTRACTOR'S BODY *with Hercules 100CD Hoist*



Sturdy, all-around unit built for heavy-duty service. Pyramid type enclosed steel side braces; full length running boards; sturdy underbody construction, with cross-members and longitudinals welded into an integral unit. Capacities to meet individual job requirements.

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Current building codes require you to use hooks on reinforcing bars *where hooks are not needed.* These codes—now obsolete—were written *before* Inland developed Hi-Bond, whose deep, reversed, double-helical ribs give greater mechanical grip, higher bonding strength . . . *before* National Bureau of Standards tests proved that Hi-Bond actually provides stronger anchorage *without* end hooks than ordinary deformed bars provide *with* hooks.

Because Hi-Bond anchors firmly, it makes possible greater use of the steel's potential strength. With Hi-Bond it is possible to build more economical and more efficient structures, using less steel and less concrete. Revisions in building codes will undoubtedly follow. Write for full information, today. INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

The present demand for Hi-Bond greatly exceeds our ability to supply it. However, to make larger tonnages available to you, we have licensed other steel companies to make this superior bar.

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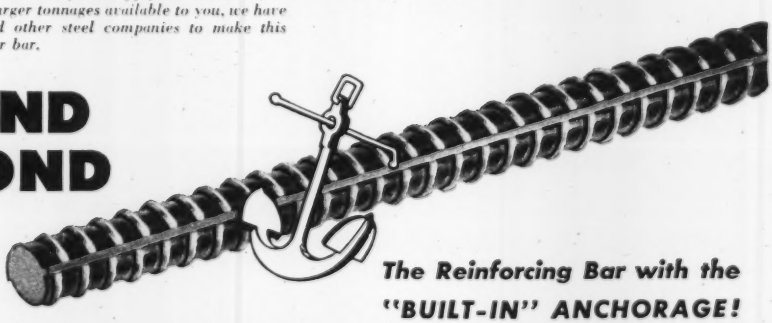

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The Reinforcing Bar with the "BUILT-IN" ANCHORAGE!

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CONSTRUCTION TRENDS

Is industry holding back on new construction?

Manufacturing companies are reported to be tapering off construction programs. And in looking forward in 1949, most observers expect that industrial construction will do well to stay close to its 1948 level.

An unprecedented survey, conducted by the McGraw-Hill Department of Economics, throws new light on this question. McGraw-Hill asked the responsible heads of leading corporations across the country about their plans for buying new plants and equipment.

The survey results show:

(1) Half of all manufacturing companies say they are "holding back" on construction. They're not going ahead with new building as fast as they might.

(2) Reasons why they are holding back are many. But the most important—mentioned by six out of ten of the companies holding back—is high costs.

There are other very important reasons why industry is holding back on construction, however.

One of the most important is that many companies can invest all the money they have in equipment that will pay for itself in three to five years. Companies were asked, as part of the survey, how soon they expect equipment and buildings to pay for themselves. That is, in how many years should a piece of new equipment or a new building earn back its original cost?

Three out of four manufacturing companies say they expect a new piece of equipment to pay off in five years or less. One company in three expects its purchases of equipment to pay off in three years or less.

When it comes to buildings, four companies out of five think a new building should pay off in 15 years or less. More than 60% of the companies insist that a new building pay off in 10 years or less.

Companies can set such high standards for new equipment, they say, because they have so many opportunities to profitably invest the funds they can get. So, they choose the opportunities that will return the money fastest. And that means, in many companies, that new equipment gets the preference over new buildings.

These rules aren't applied to all of industry's capital expenditures, of course. There are times when industry invests to meet competition, because technical changes demand it, or for other reasons. But—the McGraw-Hill survey shows that these standards are applied to a major part of all decisions on buying new plants and equipment.

Today another important reason for holding back construction is that the company might lose some production while the new building was being completed. With demand high, many companies would rather not lose that production.

Still another reason stems from court decisions on basing point pricing. The present uncertainty about pricing systems adds to the difficulties in choosing a location for a plant.

How important is the cost question?

Surprisingly, only 30% of the companies say they would increase their plans for new buildings if costs dropped. That's partly explained by the reasons given above—equipment pays off more quickly, companies don't want to lose production time, and uncertainty about location.

Beyond that, however, there is hope for a pick-up in industrial construction—even without a cut in costs.

A number of companies that cited costs as the major reason for holding back say they would go ahead if costs were stabilized. In other words, if they knew they could put through a project without having costs increase during construction, they would go ahead.

What does all this mean for the construction industry?

It shows, first, that industry has huge needs for new construction. The fact that so many companies feel they are holding back indicates they have projects in mind that they would like to carry through.

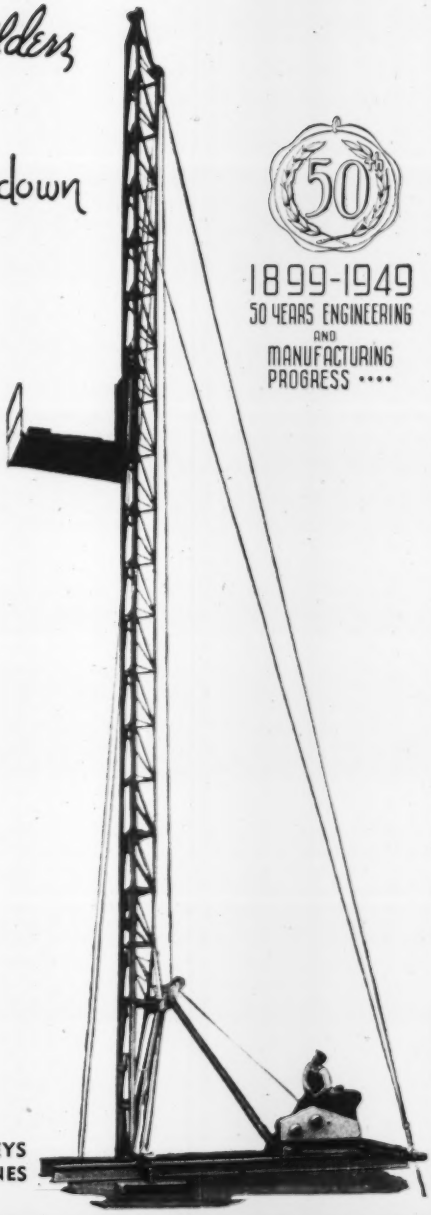
But—the survey shows—getting the money to pay for these projects is difficult. One reason is that construction costs have increased faster in postwar years than has many a company's ability to pay. Costs have climbed faster than have profits and reserves for depreciation.

Then, too, the risks in investing in equipment are less. Equipment usually costs much less than would a new building. And it promises to pay for itself very quickly.

All this shows that there is a big backlog of business that the construction industry can—and probably will begin to tap—if prosperity continues and if construction costs can be pared. The survey's findings are a major challenge to the industry.

These are only highlights of the survey, as it affects construction. More information from it, on the backlog of capital investment planned by industry, will be found on p. 62 of this issue. The survey shows that industry has tremendous needs—and plans—for improvements in its plants and equipment.

When Clyde Portable Builders Towers go up ..... Material handling costs go down



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1899-1949
50 YEARS ENGINEERING
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Clyde Portable Builders Towers are specially engineered for high speed, low cost material handling on building projects. They are easy to transport from job to job . . . load the entire machine on a truck or tow it on trailer wheels. They are simple to erect and just as simple to take down.

Towers are assembled in complete safety on ground and raised to operating position by their own hoist. No erection hazards . . . no special equipment needed. Towers up to and including 100 ft. in height are raised in this manner.

Two sizes available.

MODEL PBT . . . 40 ft. tower with 10 ft. extensions to 70 ft. Load capacity 2000 lbs.

MODEL HPBT . . . 40 ft. tower with 10 ft. extensions to 100 ft. Load capacity 2500 lbs. Platform, both models, 5'6"x6'6".

ACCESSORIES: 2000 lb. capacity derrick that mounts on top of tower . . . ½ yd. concrete bucket to be used in place of elevator platform . . . trailer wheels for towing entire machine by truck or tractor.

●

HOISTS . . . DERRICKS . . . CAR PULLERS . . . WHIRLEYS . . . BUILDERS TOWERS . . . ROLLERS . . . HANDI-CRANES

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THE CONSTRUCTION WEEK

JOINT HIGHWAY PANEL—Joint contractor-engineer meetings being held in West Virginia are aimed at accelerating the 1949 highway construction program. The joint panel, made up of the three state highway commissioners and three members of the West Virginia Contractors' Association, will study ways of simplifying construction procedures, and the elimination of any bottlenecks or minor obstacles to this year's road building program. The need for this concerted action is increased by the approval, at the election last year, of a $50 million bond amendment for secondary road construction. This is big money for this type of work.

SHADES OF CAPT. EADS—The Steampship Angele Higgins, laden with steel scrap from Cuba, recently ran afoul of a sand bar in the Mississippi River, 36 miles south of Eads Bridge. The vessel was to unload its 900-ton cargo on the docks at St. Louis, Mo., and thus fulfill a dream conceived by James B. Eads who on January 30, 1878, proposed to the St. Louis Merchants Exchange to make St. Louis a seaport. But the Angele Higgins, aground in 8.6 ft. of water, arrived in port ten days late for the planned municipal celebration to mark the fruition of Eads' dream. Normally the channel will pass essels of 9-ft. draft. This one is said to have been drawing 10.6 ft.

THOSE VALLEY AUTHORITIES—The completion of the Corps of Engineers revised "308" report (ENR Nov. 18, p. 7) will lead to increased efforts to form a Columbia Valley Authority. Senator Murray of Montana is sure to introduce both a CVA bill and a Missouri Valley Authority bill—Montana is split between both valleys. Of these bills, the one on an MVA will almost surely fail—but the CVA bill has about an even chance of passing. That's because the basin is smaller, the people there are getting to expect federal exploitation of the system and there is less divergence of purpose between the upper and lower parts of the basin.

EARTHQUAKES FOR WATER? — Engineers and geologists in the Hemet-San Jacinto Valley area are wondering if the Dec. 4 earthquake in southern California is the answer to a serious water shortage. Immediately after the tremor, flow from springs along the foothills and on several ranches doubled, and the increase has continued—at Soboba Hot Springs there is now so much water that residents are reported having trouble controlling it. In other parts of the valley, springs that haven't flowed for years have been brought to life.

GAS FOR MASS.—Paul A. Dever, newly-elected Massachusetts governor, has entered the fight to bring natural gas to his state, with an announcement that he will back efforts of the Tennessee Gas Transmission Co. to extend its transmission lines from Buffalo, N. Y., through Albany, N. Y. and into western Massachusetts.

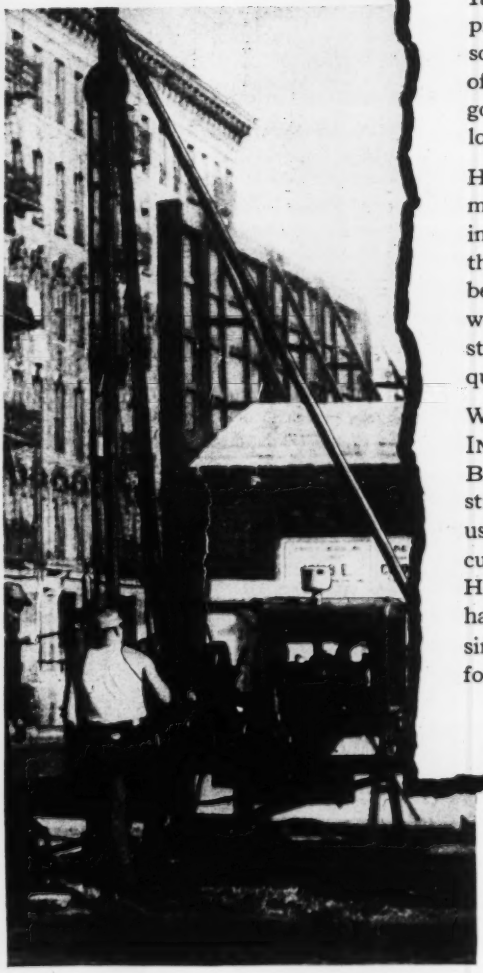
ALUMINUM IN BUILDING—That the use of aluminum as a construction material is increasing is easily appreciated. How much this increase is may be surprising. Before the war, about 4 percent of total production went into building items. Now it is nearer 20 percent. Biggest growth has taken place in such things as windows and siding. Another postwar fact is that of total aluminum production the Aluminum Company now accounts for 50 percent, Reynolds 30 percent and Kaiser 20 percent.

WATER TESTING—Pioneer work with the electron microscope at the Chicago filtration plant in quick detection—about 6 hr.—of pollution-index organisms looks promising. Orthodox bacteriological tests do not furnish results until 3 or 4 days have elapsed, thus providing little more than a historical record of water quality control. City Engineer W. W. DeBerard and his colleagues, who have been making thousands of sample correlations of what they see in the powerful 'scope and what they find with orthodox tests, report that out of every 100 samples, they were averaging better than 85 percent accuracy on water quality evaluation with this powerful microscope.

UNIFIED BOLT THREADS—No fear need be felt by the construction contractor regarding the degree of fit between repair and replacement parts carrying the newly unified screw threads, and his existing equipment. Although U. S. bolt, nut and screw manufacturers will make certain changes in thread design, to conform to the thread-standardization accord reached Nov. 18 with Great Britain and Canada, permissible tolerances will give interchangeability between old and new threaded connections ordinarily found on construction equipment. Availability of threaded repair parts, however, may become tight during the transition period when equipment manufacturers are converting from the old to the new threads.

THE PILES SUPPORT THE STRUCTURE . . .

But What Supports the Piles?



It's the soil that actually bears the load, not the piles. The piles simply transfer the load to the soil. So it isn't just a matter of installing piles of a given depth and a given diameter. You've got to make sure that the soil can carry the load the piles will transfer to it.

How? Soil Borings are the answer. Borings are made at various points and samples of the soil in the successive strata are examined. From this analysis, the bearing value of the soil can be forecast with reasonable accuracy. Then, when the indicated type of pile is properly installed, it will have the carrying capacity required.

WESTERN, in cooperation with the DRILLED-IN CAISSON CORP., is prepared to make Soil Borings and also comprehensive engineering studies of the results. We recommend that you use our FREE CONSULTATION SERVICE. Discuss your problems with one of our engineers. He speaks with authority, for WESTERN has handled every type of foundation problem since 1924 . . . without a single failure. Send for Catalog A.

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Road Building Is Lagging Because We Let It

AFTER MORE THAN THREE YEARS of postwar roadbuilding, our highway system is no better relative to the traffic volume than it was when we began. Excuses can be offered for this poor showing—lack of equipment, too few engineers, shortage of materials, too-high costs—but there is no valid excuse for the complacency with which these things have been accepted. There is an emergency in our highway situation. It should be declared as such, and emergency measures should be taken to remedy it. This is a plea for such action.

In 1948, a new record in road-building expenditures was set. The dollar volume of federal-aid work rose to nearly $800 million, far exceeding any previous year, and the total of federal and non-federal work was over twice that amount. From this, one might think that highway building last year reached a point where current replacement needs had been met, and some gain had been made on the deficit built up during the war years. But when adjustments are made for the great increase in construction costs during the war years, it will be found that the physical volume of work done—the old roads widened and resurfaced or the new roads built—fell far short of meeting the nation's all too obvious needs.

Everyone should be able to see that our highways are not adequate for the service required of them today, to say nothing of future needs that are clearly indicated by the rising automobile and truck registrations. And everyone can see that many of the older highway pavements and city streets are going to pieces rapidly under loads and traffic densities far above those for which they were built.

Despite the obviousness of these deficiencies, however, there is little evidence in legislative halls of any sense of emergency with respect to the state of our main highways. A few state governors have expressed some anxiety over conditions within their own borders, but President Truman only mentioned highways casually in his messages to Congress. He showed much more concern over farm-price support, educational aids, hospitals and increased social security. Yet nothing is so basic to the whole national prosperity as adequate highways, and no other federal expenditure pays for itself quite so quickly in new business created or continued well-being of existing concerns.

The federal-aid appropriation for the fiscal year 1950 recommended by President Truman was somewhat less than that authorized for the first three postwar years when the magnitude of the need and the great increase in highway traffic was not as apparent as it is today. States continue to divert highway revenues to other purposes, and the ordinary citizen accepts a wholly unsatisfactory traffic situation as inevitable. The small amount of vision being displayed with respect to our highway problem is little short of disgraceful for a country that is prone to brag—and often justifiably—of its expanding economy and its great future.

Probably the best estimate of what this country should be spending annually on road construction is found in a study made for this journal last year by G. Donald Kennedy, former head of the Michigan Highway Department and currently head of a special highway research staff of the Automotive Safety Foundation. Mr. Kennedy concluded that construction expenditures over the next ten or twenty years on general-use roads should average $2.4 billion annually, with possibly an additional $700 million on land-service roads. His estimate checks closely with that of the American Association of State Highway Officials, which has said that $22 billion would be needed to bring the federal-aid system up to desired standards.

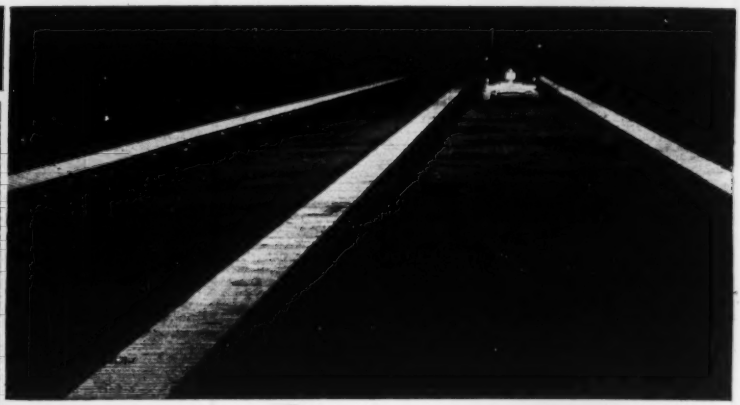
When set over against that indicated need of $2.4 billion, the 1948 record of $1.7 billion is put in its true perspective. It is woefully short. Although the total of dollars spent exceeded all past records, it still lacked $700 million of what should have been spent to offset obsolescence and growing traffic requirements.

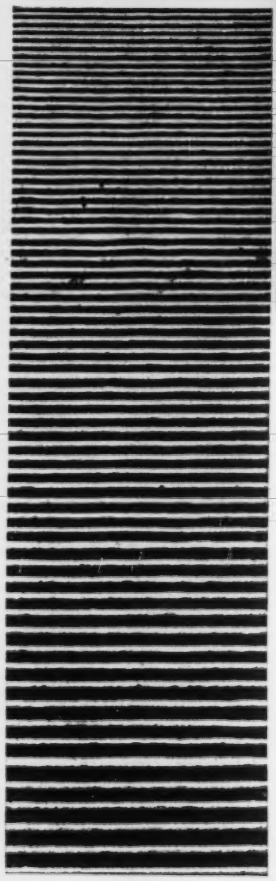
That is the hard fact behind the seemingly good record made in 1948 that must be made evident to those who prepare budgets for public expenditures or control the purse strings. From President Truman down to the rural representative in a state legislature who does not realize how closely his own prosperity is tied to a far away highway serving an industrial community, the highway emergency must be brought home as a national emergency.

Wise Words

GOOD LABOR-MANAGEMENT relations in construction are always possible when there is mutual self-respect. This well-known axiom was tossed about with good effect last week at a testimonial dinner for Peter W. Eller, who has resigned from the presidency of the Thompson-Starrett Co. to become chairman of the board of governors of New York's Building Trades Employers' Association. "Pete Eller", said AFL's George Meany, "has ability and integrity. In dealing with him over 35 years, we have always found that he recognized his responsibility to his employer, the industry, the workers and the public. This is the basis of good labor relations, and we subscribe to it." Said Mr. Eller, "I expect to give fair consideration to fair proposals. With men of goodwill there can always be peace and prosperity." These are wise words on both sides. They underline the fact that people, not legislation, are the key to good labor-management relations.

RIBBED AND WHITE—
FOR SOUND AND SIGHT





"SINGING HIGHWAY"

Guides Drivers Day and Night... by Sound and Sight

NOW . . . in daylight or darkness . . . in fair weather or foul . . . drivers' eyes *and* ears are constantly alerted to highway driving hazards . . . by means of this new double-duty traffic lane marker.

Made with Atlas White portland cement . . . or *Atlas White Duraplastic *air-entraining* portland cement . . . the ribbed surface of this day-and-night traffic guide is flush with the highway level. By *day*, its whiteness, contrasting with pavement gray, clearly defines the lanes. At *night* the faces of the corrugations catch headlight rays and reflect them back to, instead of away from, the driver, forming a continuous ribbon of guiding light.

In addition, daytime or night, when car tires pass over the slight corrugations of the traffic marker, they create a distinct whine or hum, warning the driver he is out of lane.

Thus drivers are guided day and night . . . by sound and sight . . . traffic is better channelized . . . highway travel is safer.

Send for descriptive booklet. Write to AtlasWhiteBureau, Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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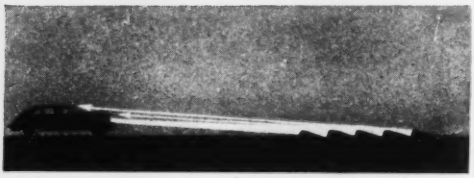
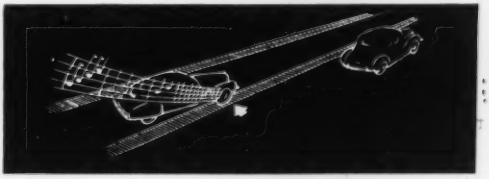


At night, corrugations catch headlight rays, reflect them back to the driver. On rainy nights the film of water makes the concrete more mirror-like, when good visibility is most needed.



When a car crosses the ribbed marker, the action of the tires creates a distinct hum or whine. It is audible day or night, and in clear or foggy weather. Drivers can *hear* as well as see it.

ENR-TM-5

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ENGINEERING NEWS-RECORD

JANUARY 20, 1949 VOL. 142 NO. 3

Planes "make" heavy rains; lawyers study legal aspects

Experiments in Arizona yield up to 12,000 acre-ft. of water, aerologist reports—Stanford University reviews problem of ownership of "fugitive and vague" cloud formations

By N. A. Bowers

A two-faceted controversy over the possibility and the effect of forcing rain from recalcitrant cloud formations appeared to be in the making last week.

Developments were:

1. Despite the abandonment of rainmaking experiments by U. S. Air Force (ENR Dec. 9, p. 67) an eminent California aerologist contends that not only is it possible to make it rain, but that his forces have actually produced 6,000 to 12,000 acre-ft. of water in one rainmaking operation last year.

2. The Stanford University (Calif.) LAW REVIEW published a highly interesting and heavily detailed discussion of legal problems involved in rainmaking experiments, under the title of "Who Owns the Clouds".

Can be done

Authority for the statement that rain can be "made" by seeding cloud formations from airplanes was Dr. Irving P. Krick, who was an adviser on weather forecasting to the U. S. Army before the invasion of the European continent, and who is now president of the American Institute of Aerological Research, at Pasadena.

Reporting to the institute on results of 27 rainmaking flights that the organization has sponsored over the watershed of the Salt River in Arizona, Dr. Krick also gave what are believed to be the first authoritative details as to amounts of materials used, and of results obtained. Although he made no direct mention of the Air Force experiments, he implied that these and other experiments have been unsuccessful because not enough rain-producing materials were used. Where other experimenters have used comparatively minute quantities of dry ice (eight pounds or less), Dr. Krick's men used between 150 and 300 lb. of dry ice, plus silver iodide vapor.

In 27 flights, he estimated these operations had produced between 6,000 and 12,000 acre-ft. of water. He said the season's rainmaking operations had cost less than $30,000 in all—and that water produced, in one day's operation had very nearly paid the cost of the entire season.

"No one has yet been able to precipitate water out of a clear sky though the atmosphere always contains some water," Dr. Krick said. The first requirement is to determine on what sort of days rain can be produced and then to determine just when clouds should be "seeded". Rising currents of air in a cloud are a good rain producer. Somewhere in such a cloud is a freezing point. There are also ice crystals which add to their own size by taking water from adjacent air. When the rising current passes the ice crystal level, rain is precipitated.

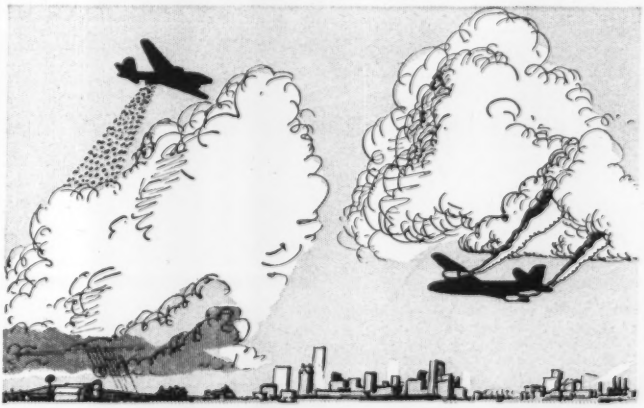
In the early morning the earth's surface is heated by the sun and rising currents may produce clouds. Between these clouds will be compensating down currents of air. These conditions are prerequisites because no amount of seeding will induce precipitation unless there is substantial vertical motion in the air currents. "Only by augumenting these 'movements'", Dr. Krick said, "have we succeeded in making rain, or additional rain."

Dropping dry ice at once produces ice crystals in the atmosphere. Any water which condenses and freezes releases its warmth to the cloud and so auguments any existing up-draft. It usually takes 15 or 20 minutes after release of dry ice to precipitate rain when working with a cloud about to drop rain. In seeding a slow-moving cloud (say six mph) it is possible to place precipitation practically in the area seeded.

Dr. Krick used two different seeding agents in the Arizona operations (1) dry ice and (2) silver iodide vapor. In 27 rainmaking flights over Arizona Dr. Krick's planes worked at elevations of 16,000 to 25,000 ft. A plane equipped to release silver iodide vapor through an atomizer would fly through a cloud bottom sending out a vapor with a tendency to float upward, its droplets forming nuclei about which natural ice crystals tended to cluster.

Another plane dropped dry ice from above clouds in batches of 150 to 300 lb. and in particle sizes of ¼ to ½ in.

(Continued on p. 59)



MAKING IT RAIN—Plane at left seeds clouds in a down-draft by dropping dry ice. At right an existing up-draft is augmented by a plane releasing silver iodide vapor.

NEWS BRIEFS

Hospitals—INDIANA's legislature will be asked for $8,500,000 for community hospital construction in a 5-year period . . . Methodist Hospital, PHILADELPHIA, PA., plans a $1,250,000 nurses' training school . . . At HOUSTON, TEX., a $2,000,000 project to add 120 beds to Memorial Hospital has been announced . . . There is a plan to rebuild the State Hospital at ROCHESTER, MINN. . . . Bids will be opened at Washington, D. C., Feb. 15 for the $10,000,000 VA hospital at INDIANAPOLIS, IND. . . . Transfer of the 1,000-bed Naval Hospital at HOUSTON, TEX., to the Veterans Administration and the cancellation of plans of a new neuropsychiatric hospital there will save $21,000,000 in construction costs.

Labor—Labor organizations in TEXAS will ask the current legislature to repeal all of the union regulatory measures enacted in recent years . . . LOUISVILLE, KY., Water Co. will offer a 5-cent-an-hour wage boost to union employees . . . Union pay scale for carpenters in DELAWARE this year will be $2.25 an hour, 20 cents an hour higher than last year . . . A pay increase of about 7 percent has been granted to 1,000 employees of the Salt River Valley Water Users Association, ARIZ. . . . Workers and employers in the highway and heavy construction industry of western WASHINGTON were deadlocked last week although management had offered a 13 cents an hour increase . . . SANILAC COUNTY, MICH., road commission has granted road workers a 10-cent hourly raise retroactive to Dec. 1, 1948 . . . In ROCHESTER, N. Y., three AFL unions have agreed to a 15-cents-an-hour increase in 1949 contracts . . . Four Scottish stone masons were flown to LONDON, ONT., to work on a building project there because of a shortage of such workers in that area . . . There will be a 20-cent wage boost for most of the 2,500 unionized building craftsmen in the BINGHAMTON, N. Y. area . . . Local unions chartered by the International Union of Operating Engineers in the ten-state Missouri River Basin area have formed the North Central States Conference, International Union of Operating Engineers, central office at OMAHA, NEB. Paul O. Larson has been assigned to represent the international office in the handling of conference affairs. The purpose is to coordinate activity and to pool manpower of the operating engineers in the area.

Public Construction—In MONTANA the Water Conservation Board will ask for $1,400,000 for the coming biennium to make repairs, extensions and new projects selected from a list of local needs, totalling about $7,000,000 in cost . . . Barracks at Ladd Field and Fort Richardson, ALASKA, will be constructed by a syndicate headed by Peter Kiewit Sons' Co. of Seattle, Wash., and Morrison-Knudsen Co. of Boise, Ida. Two contracts totalling $7,250,000 were awarded by the Alaska District, Corps of Engineers . . . In CLEARWATER, FLA., a proposed $6,000,000 county-wide school construction program will be submitted to a county board this month, with the request that a school bond election be held by early March . . . A request for $39,822,000 to be spent on construction at the University of MINNESOTA during the biennium starting July 1 has been submitted to the State Legislature . . . T. T. Sullivan of the Illinois Public Safety Department has recommended a $16,000,000 program for improvements at ILLINOIS state prisons at JOLIET, STATEVILLE, PONTIAC, MENARD and VALDALIA . . . A public hearing will be held January 24 on the proposed deepening of the Illinois and Mississippi Canal, connecting the upper Illinois River, at HENNEPIN, ILL., with the Mississippi River at ROCK ISLAND, ILL. The Board of Engineers for Rivers and Harbors will consider the proposed $99,000,000 improvement, which would deepen from 6 to 15 ft. the present canal, add seven new locks and 36 new bridges.

Correction—Storage capacity of Rihand Dam in India is to be 8.87 acre-ft. and not 80.87 acre-ft. as reported in ENR Dec. 16.

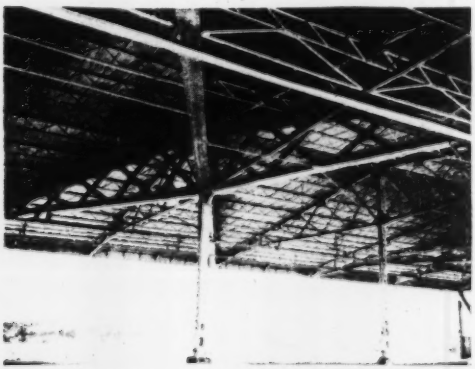
Phillips Moore made CAA assistant administrator

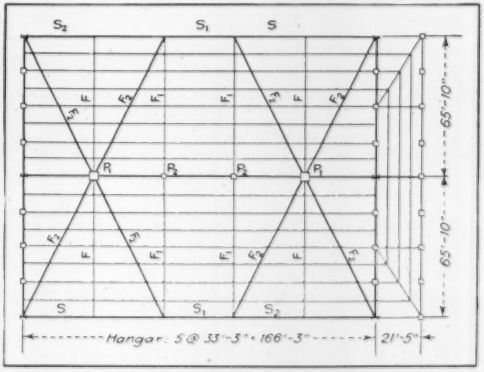
Phillips Moore has moved up to larger responsibilities as assistant administrator for airports of the Civil Aeronautics Administration. He succeeds H. A. Hook, who transferred to California in October.

Edgar N. Smith, who had been acting as assistant administrator, continues as deputy assistant administrator, the post he held under Mr. Hook.

Mr. Moore has been with the CAA and its predecessor agencies since 1933, most recently as director of airport engineering service.

Mr. Smith joined the CAA in 1944 as airport planning consultant, and since 1945 has been director of airport planning service.





SKEW TRUSSES—Principal structural steel members of a French hangar at Aix-Les-Bains-Chamberg are the columns P and the diagonal cantilever trusses F_2, permitting unobstructed openings for the full length on two sides of the hangar. The diagonal trusses support roof purlins, transverse truss F, and edge girders S. The hangar was constructed for the French Air Ministry by Schmid, Bruneton & Morin of Paris (L'Ossature Metallique, Nov., 1948).

Rain making poses many legal problems

(Continued from p. 57)

By causing an increase in precipitation in one area, Dr. Krick is quoted as saying, one does not usually decrease rainfall in another. The atmosphere, he said, always contains plenty of moisture and when less than 1/20 or 1/10 of one per cent is extracted, natural diffusion replaces this within an hour.

It cost $150 per hour for the silver iodide plane and $250 per hour for the dry ice plane. Two days of flying that cost $2,500 obtained water that, at the current value of $14 per acre-foot, paid for the entire summer's operation.

Who owns the clouds?

News reports of threatened legal controversy between Nevada and Utah over artificial rainmaking, meanwhile, turned the spotlight on a new aspect. Who owns the water in the clouds? Thus far, rights to clouds have not been legally determined, simply because problems concerning them have not heretofore arisen.

Unusually comprehensive treatment of the whole subject of artificial rain is given in an article "Who Owns the Clouds" in the November 1948 issue of the STANFORD LAW REVIEW. In addition to contributing much analysis of legal aspects this article, from which the following has been taken, gives reference to numerous court decisions and other sources of related information.

Patented rainmaking

A patent on artificial rainmaking by use of "liquefied carbonic acid gas" was issued in 1891 to one Gathman. His process used compressed gases contained in a projectile fired into the air where it was exploded, allowing the gas to expand rapidly and to cool. On cooling, it is now believed, innumerable minute particles of dry ice were formed. Thus, perhaps unknowingly, Gathman really used a process much the same as that now in vogue.

There was litigation over artificial rainmaking some 32 years ago when claims totaling almost $1,000,000 were filed against the city of San Diego, Calif., for floods caused by heavy rains just after the city had employed a professional rainmaker (Charles M. Hatfield) to produce rain. This resulted, however, in a non-suit decision. Not discouraged by that experience, San Diego County last year joined with several irrigation districts to retain a modern rainmaker for a fee of $30,000. Lloyds of London provided property damage insurance up to $500,000. (ENR Sept. 16, p. 72.)

For a long time it was customary to refer to the ad coelum doctrine whenever there is discussion of rights to objects in the air. This doctrine held that who owns the surface soil also owns up to the sky above it. However, there seems now to be a general conclusion that the ad coelum doctrine "is not law and never was the law."

The general rule is that common property in a wild state comes into the possession of the first person to "occupy" it. For example, wild life that roams free in nature is common property so long as it remains in its wild state; when wild birds or animals are reduced to possession (or "occupancy") they become the property of the possessor.

Clouds are common property, but the "vague and fugitive nature" of a cloud prevents occupancy. Trying to assert legal title to a cloud is regarded as ridiculous because the cloud continually changes shape, location, content and size; or it may even evaporate entirely.

However, water that makes up the clouds has quite another legal status. While water remains in the clouds it is common property just as the clouds themselves are, but when the water is reduced to possession it becomes the property of the possessor. There seems to be no question that a land owner has certain rights to water that passes over his land in the form of clouds.

The problem of interpreting the law arises with question as to the extent to which one land owner, by his diversion of cloud-borne water, may legally interfere with the established use of that water by other land owners accustomed to receiving it through the natural phenomenon of rain.

To illustrate the complexity of this situation it may be cited that a riparian land owner who does not use his share of a water right does not lose that right, simply through non use. However, he may lose a natural right by adverse use, that is, by neglecting to exercise his right when others appropriate for beneficial use. It may be found that the law will protect the owner of rights to air-borne water only in so far as he exercises or uses his rights when necessary to do so to preserve them. Continued practice of rainmaking would give the rainmaker some claim at least to the additional water he thus produced.

Riparian vs. public water statutes

All seventeen western states have laws concerning surface waters, but there is almost an even division as to acceptance of the riparian doctrine. Nine states follow the "Colorado doctrine" in which water may be acquired initially only by appropriation. Eight states follow the "California doctrine" recognizing riparian rights primarily.

There is good reason for the belief that states following the Colorado doctrine will refuse to recognize natural rights to rainfall, since natural rights are similar to riparian rights in many respects.

Two difficult issues of fact will face any plaintiff who seeks damages on the grounds of interfering with his rights to water in clouds. First, the plaintiff must prove that the defendant caused rain in this particular case; second, that the plaintiff was injured thereby—that his use of land was interfered with by the defendant's rain.

The first of these requirements may become easier after publication of a report on experiments now being made by the U. S. Weather Bureau on an investigation of rainmaking. On the second count, proof may depend on the basic question of what effect artificial rainmaking has upon natural rainfall. If rainmaking causes rain that would not naturally have fallen, there is no interference with natural rights. The probabilities are that artificial rainmaking will both cause additional moisture to fall and redistribute moisture that would otherwise have fallen.

UNDERWATER PHOTOGRAPHERS—Preparing to take underwater pictures of the spillway bucket on Grand Coulee Dam, Harold Maiken of Portland, Ore., (left) and D. S. O'Donnell of Coulee Dam inspect photographic equipment devised by Maiken. Their job was to get pictures of the spillway bucket, damaged by erosion.

Construction appropriations proposed; 81st Congress must now dispose

Corps of Engineers, PRA, USBR and TVA all to receive large funds for new work and continuation of old—Cut in VA funds asked

Congress was beginning to get down to cases last week on bills that would effectuate—with needed funds—the construction items included in President Truman's huge $41.9 billion budget.

In his budget message (ENR Jan. 13, p. 9) the President had asked a total of $2.2 billion in appropriations for construction by the federal government and it agencies. But observers believe the government's total expenditure for fiscal year 1950 would total nearer $3 billion when unexpended and other funds already available to the various agencies are added.

Specifically, Mr. Truman recommended construction funds for:

Corps of Engineers—$481 million for flood control and $217 million for rivers and harbors.

These totals would include two new projects under the heading of flood control—a $1,000,000 appropriation to start the $58,000,000 central and southern Florida project, and $300,000 to start a $635,000 project near Rosiclare, Ill. Other flood control projects, already under way, for which new appropriations were asked include: Garrison, N. D., $31,000,000; Fort Randall, N. D., $25,500,000; Wolf Creek, Ky., $20,200,000; Bull Shoals, Ark., $16,500,000; Buggs Island, Va. and N. C., $16,500,000; Clark Hill, Ga., $14,500,000; Fort Gibson, Okla., $14,000,000; Whitney, Tex., $14,000,000; Harlan County, Neb., $12,500,000; Detroit, Oreg., $11,300,000; and Lookout Point, Oreg., $11,000,000. Pine Flat, Calif., $8,600,000; Conemaugh, Pa., $8,500,000; Allatoona, Ga., $7,147,800; Center Hill, Tenn., $7,000,000; Mt. Morris, N. Y., $6,500,000; Texarkana, Tex., $6,000,000; Whittier Narrows, Calif., $5,000,000.

Under the heading of Rivers and Harbors, the President asked for funds to start work on the $205 million Chief Joseph (formerly Foster Creek) Dam on the Columbia River, and the $86,000,000 Ice Harbor lock and dam on the Snake River. Both these projects would also produce hydro power.

Ten new projects besides Chief Joseph and Ice Harbor are included in the rivers and harbors appropriation of $249 million proposed for the Corps of Engineers. The three largest of the ten are: Demopolis lock and dam on the Warrior River, Ala., $1,200,000 requested, total cost estimated at $16,623,200; Schuylkill River, Pa., $500,000 requested, total estimate, $17,000,000; and Cheatham lock and dam, Cumberland River, Ky., $2,000,000 requested, total estimate, $9,739,000.

For river and harbor projects already under way, the schedule of appropriations lists among the larger requests: McNary lock and dam, Columbia River, Wash., $40,000,000; Chain of Rocks, Mississippi River, $12,000,000; Jim Woodruff lock and dam, Fla., $8,900,000; Lock No. 2, Monongahela River, Pa., $4,500,000; and Missouri River, Kansas City to Sioux City, $4,000,000.

Public Roads—A $423.5 million appropriation, and contract authorization of $470 million to the Public Roads Administration. Other highway funds recommended are $29,948,000 for the Department of Agriculture, and $29,542,000 for the Department of Interior, including work on highways in Alaska.

Bureau of Reclamation—A total of $356 million. Actually, reclamation will start no completely new projects in fiscal 1950, although a new steam plant—a 240,000 kva. project on the Central Valley Project in California—is being added to an already going project.

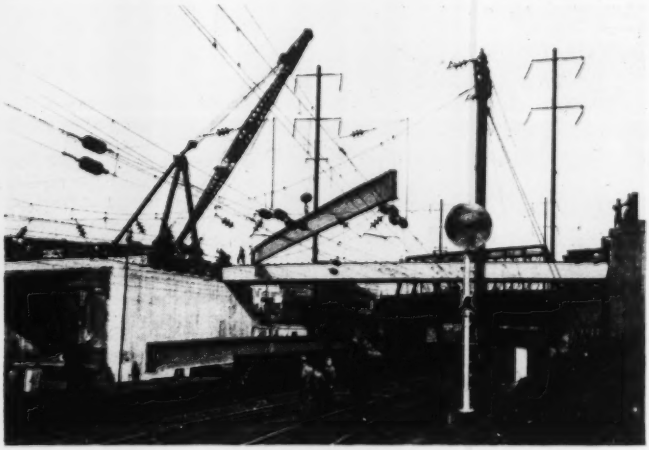
Six major projects would require more than $300 million of the appropriation. By projects, the amounts requested are: Central Valley, $63,000,000; Davis Dam, $38,739,000; Colorado-Big Thompson, $21,500,000; Hungry Horse Dam and power plant, $24,000,000; Columbia Basin, $69,500,000; Missouri River Basin, $87,150,000.

Tennessee Valley Authority—An appropriation of $49,500,000. Expenditures of the agency are estimated at $69,000,000, of which TVA would supply $21,500,000 from its own funds. Additionally, the President asked an immediate $3,000,000 for the proposed steam plant at New Johnsonville, Tenn., to be followed by a fiscal 1950 appropriation of $17,000,000. Total estimated cost of the plant is $54,000,000.

St. Lawrence Waterway—Congress was asked to approve the $492 million waterway and power development, and to make a $20,000,000 appropriation—of which $8,000,000 would be expended during the year.

Federal Aid Hospitals—A $20,000,000 appropriation, and $75,000,000 contract authorization.

Veterans' Hospitals—A $260 million



PRECISION HOISTING—Placing 20-ton, 65-ft. girders becomes a delicate operation when they must be hoisted through an 11-ft. space in overhead electrification wires. Twelve girders were erected over the Pennsylvania Railroad mainline at Trenton, N. J., while 100 trains a day passed the site. Kaufman Construction Co., of Philadelphia is contractor.

appropriation represents a cutback in number of beds to be provided, and cancellation of some hospitals.

Aviation—Funds recommended include $15,000,000 to the National Advisory Committee for Aeronautics, and —in cash to CAA—$23,650,000 for air navigation facilities and $15,000,000 for federal-aid airports. For the airport program, CAA also would get $36,500,000 in contract authorization.

Atomic Energy Commission—Estimated expenditures of $326 million to provide community, research and production facilities in fiscal 1950 would be nearly matched by recommended construction appropriations of $323 million for that year. In addition, according to budget figures, AEC would be due to receive contract authorization of $149 million.

Military Construction—A total appropriation of $203 million suggested for fiscal 1950 is made up of $134 million for the Army, $53,000,000 for the Navy, and $16,000,000 for the Air Force. Of $302 million estimated for actual expenditure that year, the Army accounts for $174 million and the Navy for $123 million, with only $5,000,000 planned by the Air Force.

The fiscal 1950 budget recommends $21,400,000 in appropriations or allotments for topographic mapping and geodetic control surveys and for assembling of hydrologic data. In the same way, $12,600,000 is recommended for continuing preliminary surveys on construction projects that are under investigation for future construction. For planning of authorized projects, principally by the Army Engineers and Reclamation, the budget would provide $18,000,000.

Other recommended 1950 public works appropriations for power and conservation include: Bonneville Power Administration, $33,000,000; Southwestern Power Administration, $4,000,000; International Boundary and Water Commission, U. S. and Mexico, $2,915,000; National Park Service, $18,500,000; Forest Service, $9,752,000; Bureau of Indian Affairs, $4,176,000.

VA details cutback in hospital funds

Cancellation last week of the 200-bed general medical hospital at San Diego, Calif., offered a second concrete example of the cutback in the veterans hospital program. President Truman two days previously had announced in his budget message that he had reduced the program by dropping 24 hospitals and decreasing the size of 14 others (ENR Jan. 13, p. 9).

None of the hospitals marked for curtailment has been put under construction. The original program called for 90 new hospitals and nine additions to existing facilities at an estimated cost of $1.2 billion. The cutback represents $279 million of that estimate but means a net saving of only $237 million, because of the increase in construction costs.

Full meaning of the first cancellation under the curtailment order did not become apparent until the President made his announcement. On Dec. 21, the Veterans Administration had cancelled a 1,000-bed neuropsychiatric hospital at Houston, Tex. This project would have cost more than $18,000,000.

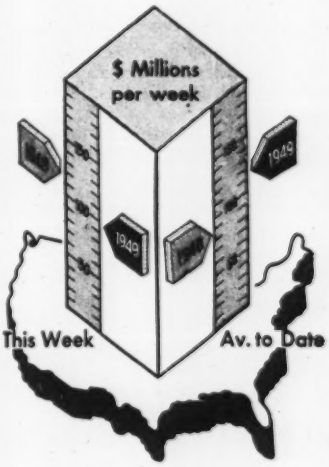
Hospitals deleted from the VA program were announced by Carl R. Gray, Jr., administrator of veterans affairs, on the day of the President's budget message. Including the two already mentioned, he named 24 proposed new hospitals to be eliminated under the terms of the President's order.

Locations of those dropped (with the size—in number of beds—indicated in parentheses) are: New York City (1,000); Gainesville, Fla. (1,000); Memphis, Tenn. (1,000); Toledo, Ohio (1,000); Houston, Tex. (1,000); Salisbury, N. C. (921); Norman, Okla. (750); Charlotte, N. C. (500); Chattanooga, Tenn. (500); El Paso, Tex. (500); Detroit, Mich (500); Decatur, Ill. (250); Americus, Ga. (250); Harrisburg, Pa. (200); Greenville, S. C. (200); Grand Rapids, Mich. (200); Duluth, Minn. (200); Mound Bayou, Miss. (200); Tupelo, Miss. (200); Klamath Falls, Ore. (200); San Diego, Calif. (200); Columbia, S. C. (200—in an addition); Thomasville, Ga. (100); and Tallahassee, Fla. (100).

Reductions in size were listed for 14 hospitals. With the downward revision in number of beds shown in parenthesis, the hospitals to be reduced in size are: Syracuse, N. Y. (from 1,000 to 500); Philadelphia, Pa. (1,000 to 500); Cleveland, Ohio (1,000 to 500); Chicago, Ill. (1,000 to 500); Oklahoma City, Okla. (1,000 to 500); St. Louis, Mo. (1,000 to 500); Pittsburgh, Pa. (general medical 1,200 to 750); Pittsburgh, Pa. (neuropsychiatric, 1,250 to 1,000); Washington, D. C. (750 to 500) Atlanta, Ga. (750 to 500) Cleveland, Ohio (1,250 to 1,000); Louisville, Ky. (750 to 500); and Kansas City, Mo. (745 to 500).

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Jan.'49	477.41	229.49
Building Cost	Jan.'49	354.91	191.85
Volume	Dec.'48	304	133



Activity this Week

As reported to ENR

Amount of contracts let

(Millions of dollars, continental U. S. only)

	Week of Jan. 20 1949	Cumulative 1949 (3 wks.)	Cumulative 1948 (4 wks.)	% Chge
Federal	$5.5	$54.4	$46.2	+57
State & Mun.	31.0	134.3	135.1	+33
Total Public	$36.5	$188.7	$181.3	+39
Total Private	60.1	165.0	161.0	+37
U. S. Total	$96.6	$353.7	$342.3	+38

Contracts by type of work

	This Week	Cumulative 1949 (3 wks.)	Cumulative 1948 (4 wks.)	% Chge
Waterworks	$1.6	$8.1	$16.7	—3
Sewerage	4.2	15.3	9.4	+122
Bridges	3.3	20.5	16.9	+62
Highways	10.8	39.3	51.3	+2
Earthwork, Waterways	3.9	45.5	20.0	+204
Buildings, Public	10.8	50.0	50.7	+31
Industrial	8.6	30.6	31.1	+31
Commercial	46.3	120.0	116.0	+38
Unclassified	7.1	24.4	30.2	+7

NOTE: Minimum size projects included are: Waterworks and waterway projects, $25,000; other public works, $50,000; industrial buildings, $68,000; other buildings, $250,000.

New capital for construction

	Cumulative 1949 (3 wks.)	Cumulative 1948 (4 wks.)	% Chge
NON-FEDERAL	$212.6	$144.4	+96
Corporate Securities	103.7	75.6	+83
State and Municipal	108.9	68.8	+111
FEDERAL	....	....	....
Total Capital	$212.6	$144.4	+96

See heavy capital spending continued

U. S. industry now plans to invest $14.1 billion in new plants and equipment during 1949—and proposes spending $40 billion in the years 1950-53, according to a survey by the McGraw-Hill economics staff.

The figure for 1949 is only five percent less than the record-breaking total actually spent in 1948, and if the plans businessmen reported are actually carried through, expenditures may well be larger than those in 1948.

The survey on which the figures are based was conducted by contacting hundreds of business leaders throughout the United States as to their own and their industries' plans for capital expenditures in the foreseeable future. A summary of the results provides an important measure of the nation's chances to maintain its prosperity.

The results are not, of course, a forecast of what industry will actually spend—but rather a report of the plans now in hand.

A breakdown of the results shows that manufacturing industries alone now plan to spend $7.2 billion in 1949 on new plants and facilities—about 7.5 percent of the estimated value ($96 billion) of all manufacturing facilities at today's prices. However, in the next five years, manufacturers indicated their expenditures will approximate 75 percent for replacement and modernization, and the remainder for actual expansion. They are spurred to this by the fact that half of all plants are today operating near 90 percent of capacity, and most would like to shave that figure by five or ten percent.

The survey notes that postwar expansion programs are virtually complete in most manufacturing lines, with the exception of steel and petroleum refining. Additionally, expansion programs of railroads, oil production and pipelines, still have from two to five years to run.

Many economists believe that capital investment has been far higher than normal. Nevertheless, the survey shows that industry today plans to spend a total of $55 billion in the five years 1949-53. As would be expected, these plans show a substantial reduction in the annual rate of investment after 1949—as the future becomes more indefinite.

The survey for the first time provides information on which to judge the level of capital investment in relation to both total present value and needs. It shows that the total value of existing facilities in manufacturing is $96 billion, and that the cost of replacing these facilities would be at least $136 billion, economists said.

Urge higher New York City salaries

Salary increases and an up-to-date increment system for all New York City's technical employees are being pushed in a vigorous campaign recently announced by the Joint Committee of Engineers and Architects. The group represents major professional organizations.

A 72-page brief supporting its recommendations for an up-grading of the salaries of all engineering and architectural positions has been submitted by the committee to the New York City Board of Estimate. Listed as a part of this brief are 15 major reasons for its adoption.

The proposed schedule of rates is as follows:

Title	Minimum	Annual Increments
Jr. Engr.-Archt.		
Draftsman	$3,900	4 at $180
Asst. Engr.-Archt..	5,000	4 at $240
Engr.-Archt.	6,200	4 at $300
Sr. Engr.-Archt...	8,600	4 at $360
Deputy Chief Engr.		
Deputy Chief Archt.	10,000	
Chief Engr.-Archt..	12,000	

The above figures represent a considerable increase over existing pay rates in the city. Average total pay, including merit increases, for city junior engineers is $3,370 per year, and salaries for engineers in this category actually go as low as $2,160. Assistant engineers average $4,310; those in the grade of engineer average $5,190 yearly; senior engineers receive on the average $7,400; those in the grade of deputy chief engineer are paid $7,950; and chief engineers receive an average of $10,300 per year.

Salaries increase elsewhere

The eleven major engineering and architectural societies united in the writing of this brief have found that salaries in the federal government have advanced whereas New York City salaries have not. It is pointed out that New York City employment requirements are far more stringent than those for federal positions.

Engineers in the city's employ have received telegrams from departments of the state of California, offering positions at salaries much more favorable than those received locally.

Another point emphasized in the findings of the joint committee is the fact that in many cases city employed engineers are required to direct work of skilled trades that are paid more than the engineers themselves.

Engineering organizations in the metropolitan area which comprise the joint committee are the Association of Engineers of New York, the Municipal Engineers of the City of New York; the Civil Service Technical Bureau, Bronx, Queens, New York, Kings and Richmond chapters of the New York State Society of Professional Engineers, Metropolitan Section of the American Society of Civil Engineers, Society of Architects and Engineers of the Board of Education of the City of New York; and the Association of Civil Engineers in the New York City Service.

Tri-state group and N. Y. C. agree on harbor clean-up

An agreement for prevention of pollution in the waters of New York Harbor has been reached recently between city officials and the Interstate Sanitation Commission, representing New York, New Jersey and Connecticut. The commission has issued a consent order under which a 10-year period is allowed New York to complete its anti-pollution program.

First section of the order accepts the city's assurance that sewage treatment works to cost $94,830,000 will be completed by Dec. 31, 1953. Secondly, the commission agrees to allowing the city until Dec. 31, 1959 to complete its entire sewage disposal program. Plans for the entire program are to be completed by the city by Feb. 1, 1954.

Ohio sanitation compact begins to show results

Every city of the Ohio River basin received notification recently to proceed "within a reasonable time" with a sanitation program that will comply with the Water Sanitation Compact which became law in Ohio, Indiana, Kentucky, Illinois, Pennsylvania, West Virginia, Virginia and New York last July. Industries of the Ohio Valley will soon receive similar notices. Official copies of the compact and a statement of policy were sent to more than a thousand municipalities. City officials were asked to contact local state engineers for details.

Reports received from more populous area indicate general acceptance and compliance with the program.

Ten states to seek halt to road tax diversion

Amendments to state constitutions which would require highway user taxes to be employed only for highway purposes are expected to be voted on by ten more state legislatures in 1949. Massachusetts, by approving a "good roads" amendment in November, became the twenty-first state to adopt such legislation (ENR Dec. 16, p. 8).

In the 21 states with constitutional amendments, 8,358,128 voters have favored passage of the amendments, while only 3,525,290 have been opposed. This margin of victory is about two and a half to one in favor of requiring highway use of special highway tax funds.

Activity in behalf of "good roads" amendments during the next year is expected in Florida, Georgia, Illinois, Indiana, North Carolina and South Carolina, New Jersey and Virginia. In New York and Rhode Island it is expected that attempts will be made to reduce diversion of highway funds.

MAJOR MEETINGS

Canadian Construction Association, Royal York Hotel, Toronto, Ont., Jan. 23-26.

Concrete Industries Exposition, Cleveland Public Auditorium, Cleveland, Ohio, Jan. 31-Feb. 3.

American Road Builders Association, annual meeting, Willard, Mayflower and Statler Hotels, Washington, D. C. Feb. 7-9.

National Crushed Stone Association, Hotel New Yorker, Feb. 7-9.

National Ready Mixed Concrete Association, 19th annual convention, Hotel New Yorker, New York, N. Y., week of Feb. 14.

National Sand and Gravel Association, 33d annual convention, Hotel New Yorker, New York, N. Y., week of Feb. 14.

National Association of Home Builders, annual convention and exposition, Stevens Hotel, Chicago, Ill., Feb. 20-24.

National Council for Stream Improvement, Waldorf-Astoria, New York, N. Y., Feb. 21-23.

American Concrete Institute, 45th annual convention, Hotel Pennsylvania, New York, N. Y., Feb. 22-25.

Associated General Contractors of America, 30th annual national convention, Waldorf-Astoria Hotel, New York, N. Y., Feb. 27-March 3.

Association of Highway Officials of the North Atlantic States, 25th annual convention, Hotel Statler, Boston, Mass., March 1-3.

American Concrete Pipe Association, 41st annual convention, Richmond, Va., March 3-6.

Construction Industries Association, Hotel Statler, Washington, D. C., March 8.

American Institute of Architects, annual meeting, Rice Hotel, Houston, Tex., March 15-18.

American Railway Engineering Assn., Palmer House, Chicago, Ill., March 15-17.

Announce extension route of Pennsylvania Turnpike

A proposed route for the 60-mile, $55,000,000 western extension of the Pennsylvania Turnpike from Irwin, Pa., to the Ohio state line near Youngstown, was announced recently by Governor James H. Duff.

As shown on the accompanying map, the line of the extended toll road would pass north of Pittsburgh and reach within 13 miles of Youngstown.

Under construction already is a 100-mile Philadelphia extension of the toll road between Middlesex, near Carlisle, and King of Prussia, east of Paoli. According to present plans the eastern terminus of this extension will be linked with the central section of Philadelphia by a four-lane highway to be built along the Schuylkill River (ENR July 8, p. 131.)

When both east and west extensions are completed, the Turnpike will extend for a distance of 320 miles without any grade crossings. The original 160-mile Irwin-Middlesex portion of the toll road cost $75,000,000 ten years ago, and the Philadelphia extension will cost another $75,000,000, according to estimates. Construction is paid for by Turnpike bond issues. In announcing the western extension route, the governor reported that during 1948 the Turnpike Commission collected $5,600,000 in tolls from the existing stretch of road.

Peter W. Eller to head N. Y. building contractors

After 36 years with the Thompson-Starrett Co. as construction manager and president, Peter W. Eller has resigned to take over the full-time job of chairman of the board of governors of the Building Trades Employers' Association of New York City. He succeeds Christopher Norman, who has held the job since the organization was founded 45 years ago.

At a testimonial dinner, Jan. 13, both labor and management acclaimed Mr. Eller as one of the nation's wisest and most able authorities on construction labor relations. He was instrumental in bringing about the current wage stabilization agreement which New York City's contractors and the 30 unions representing a million building trades workers have signed for a three year period. He has served as national referee for the AFL building trades department and has been a member of many strike negotiation committees in New York. Prominent among the speakers who welcomed Mr. Eller to his new job with confidence and satisfaction were George Meany, secretary-treasurer, AFL; Herbert Rivers, secretary, AFL Building Trades Department; and Howard McSpedon, president of the New York City Council of the Building Trades Department.

New England flood starts valley authority action

Millions of dollars in damage was caused on New Year's eve when Connecticut River Valley waters went on a rampage and flooded western Massachusetts, Vermont and Connecticut communities. The flood (attributed to a seven inch rainfall on frozen, mountainous terrain) was the most devastating to hit New England since 1938, and only a sudden drop in the temperature prevented greater damage.

Scarcely had the high waters begun to recede when a group of western New England citizens organized themselves as the Connecticut Valley Development Committee and took steps to bring a permanent end of flood conditions. A telegram went to President Truman asking his support of a Connecticut Valley authority bill, soon to be filed by New England representatives in Washington.

Thousands of persons in the flooded areas of the three states had to be evacuated from their homes. In North Adams, Mass., a business block toppled into the raging river and highways were flooded.

Big scrapers prove their mettle on short hauls and heavy fills for . . .

Cleveland's Top-Priority Willow Freeway

FREEWAY CONSTRUCTION in metropolitan areas invariably calls for the ultimate in complete job-planning and synchronized stage-construction. Planning for a 1.7-mile, $2,994,000 contract on Willow Freeway—the number-one priority freeway in Cleveland, Ohio—is an excellent example.

A fast-moving excavation schedule was established, with nine scrapers working a single 12-hr. daily shift rather than the more normal two 8-hr. shifts. Cuts were not deep, but embankments reached 70 ft. in height, and wet weather and complexity of the job necessitated considerable stockpiling and double handling of excavation.

Four interdependent structures at one location required programming the work to extend through two complete winter and two summer construction seasons.

The four-structure potential bottleneck in the overall progress plan included: (1) construction of a 1,100-ft., $185,000 twin barrel reinforced concrete box culvert, (2) a two-span, $145,000 bridge to carry Fleet Ave. over the freeway, (3) a 70-ft. fill carrying four-lane concrete pavement on one approach to the new bridge, and (4) demolition and removal of the 40-year old Washington Park Blvd. bridge located adjacent to the new bridge. A contract for the complete job—grading, draining, paving, structures and landscaping—was awarded to the Horvitz Co., of Cleveland in November 1947. Work was started in January 1948 and completion date is Nov. 1, 1949.

In setting up his work schedule for this part of the job, the contractor keyed everything to the demolition and removal of the old bridge this winter. With the old bridge out of the way, freeway embankment and concrete pavement in that area can be completed this year.

Box culvert built first

The box culvert had to be built first, since it extends under the approach fill to the Fleet Ave. bridge, and terminates a short distance below Washington Park Blvd. bridge.

Construction of the culvert, containing 3,000 cu. yd. of concrete, was started on Feb. 15, 1948. It was completed in 60 days, despite adverse winter weather. All concrete was placed under canvas-covered, timber-frame enclosures, and steam heated to 50 to 70 deg. F. for five days.

The normal stream flow was diverted around the site in an open channel. Seepage into the construction area was kept drained ahead of concrete operations by a clay tile and slag underdrain installed beneath the bottom slab of the culvert. No pumping of seepage water was necessary.

The barrel openings in this rigid-frame twin box are octagonal, 6 ft. 2½ in. wide and 7 ft. 1½ in. high at the center lines. All concrete was placed in steel forms. Interior forms, made up in 8-ft. sections for the walls and top slab, were carried on pneumatic-tired dollies operating on the previously poured bottom slab. Exterior forms were single sections of flanged steel forms, 8 in. high and 8 ft. long.

The 1,100 ft. of box culvert was constructed in 44 sections, each 25-ft.,

OLD ARCH BRIDGE at Washington Park Blvd. will be removed this winter to make way for constructing a 70-ft. embankment to carry the freeway over a 1,100-ft. twin-box culvert, built during the past winter.

two pours to each section, or 88 pours in all. The work was coordinated to average five 25-ft. sections completed each week. This wintertime construction added to the contractor's cost for the work, but it enabled him to start the second step on schedule early last spring.

The second and third construction units at this location—the Fleet Ave. bridge and the 70-ft. high approach fill and pavement—had to be completed during the normal 1948 construction season in order that demolition of the Washington Park Blvd. bridge could be started this winter. The two units were completed and opened to traffic last Dec. 1, carrying traffic that formerly passed over the old bridge. Demolition of the old bridge is now under way.

Bridge substructure built in 11 days

While long-range planning kept the overall job on schedule, time-table programming of the individual operations paid dividends in time saved.

(Right) DUAL 24-FT. PAVEMENTS, from State Route 17 to Dalton Ave. will be completed this year, and contracts awarded for extending the freeway north to Broadway Ave. which will carry traffic from U. S. Highway 21 into downtown Cleveland.

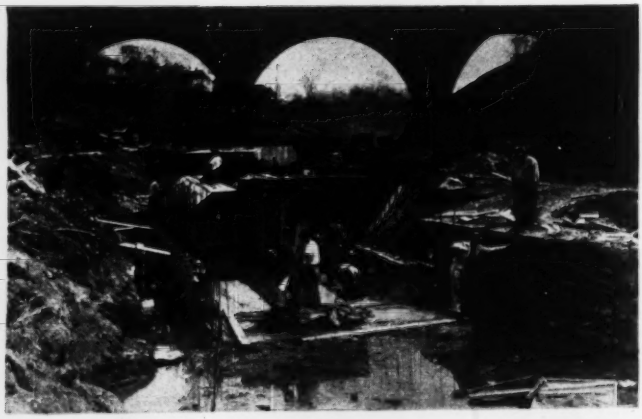
As one example, the entire substructure of the Fleet Ave. bridge, up to the bridge seats, was completed in eleven working days to meet the scheduled arrival of superstructure steel.

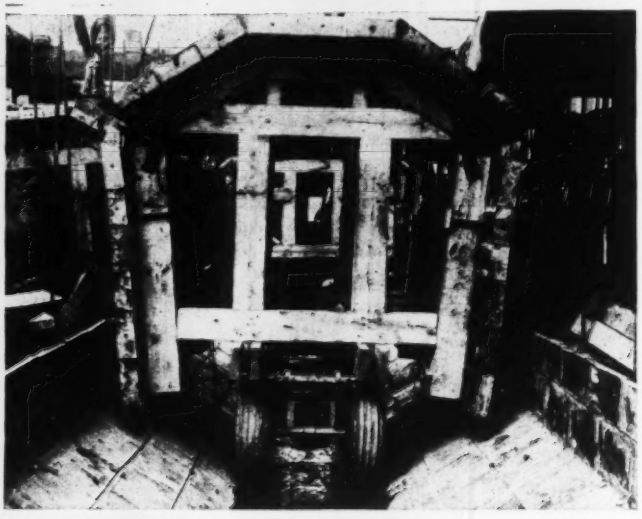
This bridgework involved the construction of two 80-ft. long by 25-ft. high rigid-frame abutments, each containing 900 cu. yd. of concrete. It also included an 80x25-ft. pier containing 150 cu. yd. of concrete in its six columns and single plate footing.

In addition, 1,100 cu. yd. of excavation extending 8 ft. into water-bearing sand called for a tight timber cofferdam for each of the three substructures, complete with continuous sump-drainage. All this was done in eleven working days, by a crew of 12 carpenters, 4 equipment operators, 2 concrete finishers, 2 iron workers, 12 laborers and a foreman.

Panel forms for maximum reuse

Timber forms, however, had been fabricated in panels prior to starting construction of the bridge substructure. These forms, as well as those for the other bridges and retaining walls, were built chiefly of plywood on timber studding and designed for maximum reuse. This proved profitable both in time and cost savings—425,000 sq. ft.





SECTIONAL STEEL FORMS, permitting fast wintertime construction of the twin-box reinforced concrete culvert (at top), were moved by special pneumatic-tired dollies (at bottom) operating on the previously poured bottom section of the culvert. The haunched bottom slab and 16-in. of walls were faced with vitrified clay liner to protect concrete during dry-weather flow of industrial wastes.

of formwork will be needed for the 17,000 cu. yd. of concrete in the bridges and retaining walls.

Completion of the substructure of the Fleet Ave. bridge on schedule permitted erection of the two-span continuous steel beam and reinforced concrete deck superstructure according to schedule, and opening of the bridge to traffic last Dec. 1. The bridge was a 51 ft. roadway and two 6-ft. sidewalks. It will carry Fleet Ave. over the freeway which will be depressed at that location.

There are three other bridges in the Horvitz Co. contract. A $181,000 two-span continuous steel beam and reinforced concrete deck bridge will carry Harvard Ave. over the freeway. Each span is 59 ft., with a 70-ft. roadway and 6-ft. sidewalks. A 73-ft. span rigidframe, reinforced concrete bridge costing $172,000 will carry the freeway over the Wheeling and Lake Erie R. R. It has two 36-ft. roadways with 9-ft. raised median, and 1 ft. 9 in. emergency walkways. The fourth structure in the project is a $61,000 seven-span, 500-ft. reinforced concrete pedestrian overhead, with 7-ft. walkway, spanning the freeway and an existing street.

Construction of the approach embankment at one end of the Fleet Ave. bridge also included relocation of parts of two existing streets and some ramp construction to the freeway. The completed facility crosses a gulley on a 70-ft. fill, carrying two 24-ft. concrete pavements separated by a 30-ft. sodded median.

Pavement laid on new fill

One unusual requirement of this part of the job was that its construction schedule called for both the fill and the pavement to be placed during the 1948 construction season. Fortunately, the embankment material was a sandy blue clay, on which the required 100-percent compaction at optimum moisture content could be secured without too much difficulty.

Construction of this big fill, containing 300,000 cu. yd. of material, was started last July 15 and completed on Oct. 15. The roadway pavement was opened to traffic last Dec. 1, thus permitting the wintertime demolition of the adjacent Washington Park Blvd. Bridge. Built in 1906, this old bridge is 400 ft. long and about 70-ft. above streambed. It contains five reinforced concrete arches, faced with stone.

Earthmoving also was an important item since the contract includes 680,000 cu. yd. of excavation and 180,000 cu. yd. of special borrow. Wet weather, last spring, threatened to slow up the job, but foresighted job-planning kept the earthwork on schedule.

A considerable amount of overburden was clay and loam, especially difficult to handle when wet. But underneath were substantial deposits of sandy material which could be worked in wet weather.

These sandy deposits were located by subsurface borings in advance of excavation. During dry weather the loam overburden was removed, leaving the sandy material to be excavated during wet weather. As a final expedient, excavated material was stockpiled when the embankment under construction was too wet to support the earthmoving equipment. A total of 100,000 cu. yd. of excavation was stockpiled and, later, incorporated in the fills. Although the double-handling of such material added somewhat to the contractor's jobs costs, it was deemed necessary in expediting the job. Part of the stockpiled material was surplus excavation from an adjoining contract on the project.

Starting last spring, seven 13-cu. yd. earthmoving scrapers were put to work —three drawn by track-type tractors

and four by their own pneumatic-tired power units. By mid-summer, the tempo of earthmoving was stepped up with the addition of two 24 cu. yd. scrapers purchased at the Road Show in Chicago. They are drawn by 100-hp. track-type tractors. This fleet of 9 scrapers moved up to 12,000 cu. yd. of material in a 12-hr. day, on 1,000-ft. average hauls. Maximum haul on the job is 1,800 ft.

In general the earthmoving equipment was operated on a 70-hr. week basis—five 12-hr days and 10 hr. on Saturday. Although this involved premium payment for overtime, it served to attract and hold competent operators in a highly-competitive labor market. It also placed responsibility squarely on each operator for the continuous and efficient operation of his particular equipment, and facilitated the proper maintenance and servicing of the equipment.

The Willow Freeway starts at a cloverleaf intersection with Schaaf Road (State Route 17) about 6.5 mi. south of the Public Square in downtown Cleveland. It will carry heavy traffic on U. S. Highway 21 leading to Akron, Canton and Massilon, Ohio, and points south. It also will relieve a bad traffic problem on Broadway Ave., leading into the heart of the city.

Designed as a limited-access expressway, it will contain dual 24-ft. concrete pavements separated by a 33-ft. medial strip. Ultimately, two inside lanes of 12-ft. pavement will be added, leaving a 9-ft. median. Curvature is limited to 3 deg. and grades to 3 percent except on ramps where they reach 5 percent.

One-mile of retaining wall

Where space permits, the freeway is located on a 200-ft. right-of-way. Nine large retaining walls, however, are being completed this winter either to confine the embankment or protect roadway cuts where adequate right-of-way could not be secured. Retaining walls, both cantilever and counterfort types, reach a maximum height of 32 ft. The longest single section is 1,430 ft., and total length of the nine sections exceeds one mile. Total contract cost of the retaining walls is $493,000. Wintertime construction of these walls will not be the most economical, from the contractor's standpoint, but their completion by spring is necessary in the overall excavation and embankment construction schedule.

To date, $8,630,000 has been spent for right-of-way and construction contracts for 3.5 miles of freeway from the cloverleaf to Dalton Ave. The cloverleaf interchange was completed in 1938. The Lombardo Bros. Construction Co., Cleveland, are building 1.7 miles of freeway just north of the cloverleaf. Four bridges were built in 1947 by the National Engineering and Contracting Co., Cleveland, to carry tracks of the Newburgh and South Shore R. R. over the freeway. The Horvitz Company contract extends on to Dalton Ave.

Current plans are to award contracts this summer for extending the freeway on north to an interchange near East 49th St. and Broadway Ave. Estimated cost of this 1.5 mile section is $1 million for construction and $1 million for right-of-way. For the present, at least, it is believed that Broadway Ave. will be able to handle traffic from the completed freeway into downtown Cleveland.

Willow Freeway is being constructed as a regular state and federal-aid urban expressway project, with Cleveland and Cuyahoga County furnishing the right-of-way.

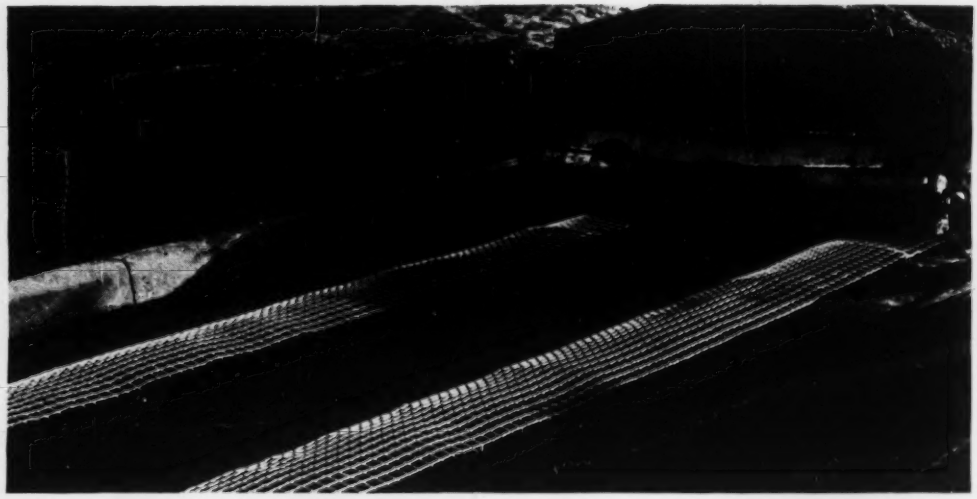
FLEET AVE. BRIDGE, with its streamline design and attractive welded handrail on concrete posts, is typical of the bridge crossings where the freeway is depressed to pass under existing streets.

MOUNTAINS OF BORROW were converted into big embankment fills by tractor-drawn scrapers. A single, long daily shift was preferred to two 8-hr. shifts.

General supervision of the work is under T. J. Kaver, director of the Ohio Department of Highways; Frank Williams, chief engineer; Glenn Logue, bridge engineer; and Homer Anderson, construction engineer.

Direct responsibility for construction is under the department's Division 12, with headquarters in Cleveland. Edward Cheydene is division engineer; Arthur Stevens, engineer; Walter Anderson, construction engineer; John J. Coughlin, division field engineer; and Norman M. Wilkie, planning engineer. Project engineers on the job are C. E. Scott, assisted by F. J. Patton; Ross Selfridge and J. G. Rogers.

For the Horvitz Co., Al. Kohn is general superintendent; E. C. Blosser, chief engineer; Carl H. Heinzerling and Ferral Shons, construction superintendent. All photographs were furnished through the courtesy of T. W. Kinnear, assistant chief engineer, for the Horvitz Co.



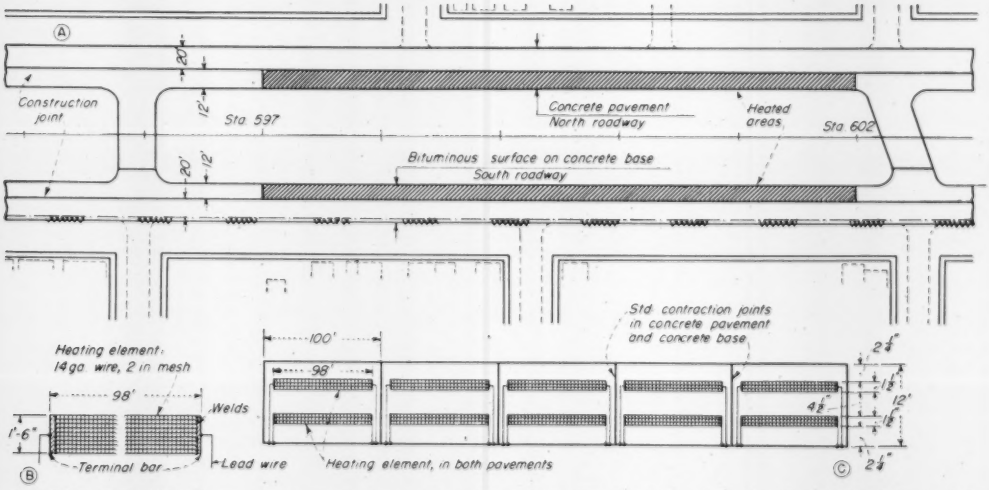
STANDARD SIDEWALK REINFORCING, placed between base and top courses of asphalt and concrete pavements, when heated with electricity, will keep a 500-ft. test section of Michigan highway free of snow and ice.

Ice Control by Electric Radiant Heating

RADIANT HEATING will be used experimentally this winter to keep two test sections of Michigan highways free of snow and ice. The heat will be furnished by electrically-charged wire grids placed 1½ in. below the surface.

Located on Eight Mile Road, in Ferndale, Mich., just outside of Detroit, the experiment involves two 500-ft. lengths of divided highway. One highway pavement is portland-cement concrete; the other bituminous resurfacing on a portland-cement concrete base. Both roads are two lanes wide, with an 18-in.-wide heating element installed under the normal wheel-track areas in the inside or passing lanes.

Complete observations on the in-



HEATING DETAILS—Two types of pavement—concrete and bituminous—will be heated electrically (A) with 18-in. x 98-ft. welded wire grids (B) located under the wheel-track areas of the pavement (C).

stallation are being made this winter by the Testing and Research Division of the Michigan State Highway Department. Chief objectives include: (1) determining the practicability and effectiveness of electrical radiant heating for snow and ice control on both concrete and bituminous pavement, (2) cost of operation, (3) effect of the radiant heat under various climatic conditions, and (4) dependability of operation in bad weather. If the experiment proves successful, similar heating installations may be incorporated on ramps of Detroit's expressways — now under construction — where immediate ice control is necessary for safety.

The 500-ft. section of portland-cement concrete pavement was completed last Aug. 6 and the 500-ft. of bituminous resurfacing was laid on Sept. 15.

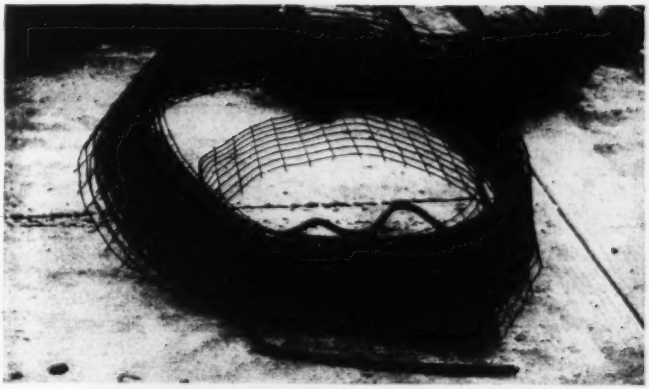
The heating elements in both pavements are identical. They were made by welding electrodes to the ends of 98-ft. sections of standard 14-g., 2-in. square mesh sidewalk reinforcing, 18-in. wide. Terminals at each end of a section were connected to wiring that was carried under the roadway forms to hook into underground power lines.

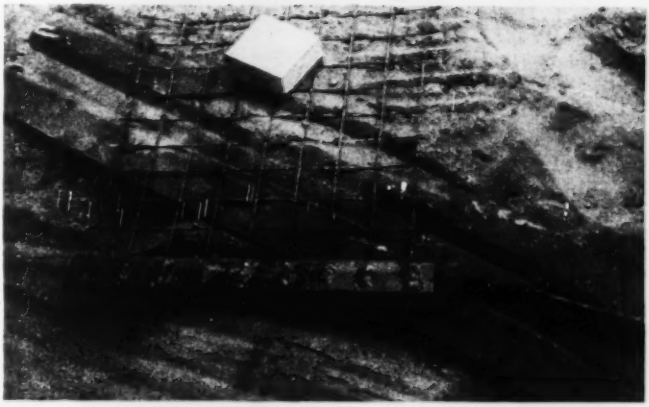
Automatic temperature control

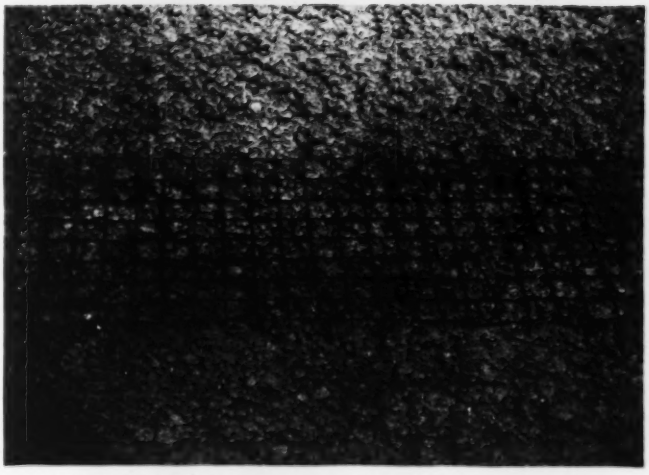
Temperature of the pavements will be controlled by thermostats that will start the current automatically when the roadway surfaces fall to 34 deg. F., and "cut out" when it reaches 40 deg. F. While this temperature control will be fully automatic, manual controls are also incorporated to cope with possible sudden and heavy snow or sleet falls that might cause dangerous driving conditions when the pavement temperature is above freezing. Experiments are now being conducted with the object of producing an automatic control that would take care of this latter condition. If this control is perfected, it will be added to the present installations at Ferndale, making winter maintenance of the test sections of highway fully automatic.

Total cost of installing the electrical heating grids for the 1,000 ft. of highway, including electrical equipment and controls, was about $2,500. Under normal winter weather, the cost of electricity for heating both 500-ft. sections of pavement is estimated to be only $0.75 per hour.

This operating cost is based on electric current flowing an estimated 50 percent of the time, consuming 150 kw. per hour, at a commercial rate of one cent per kwh. The heating elements are designed to operate on about 50 w. per sq. ft. of wire grid, under a maximum voltage of 65 v.







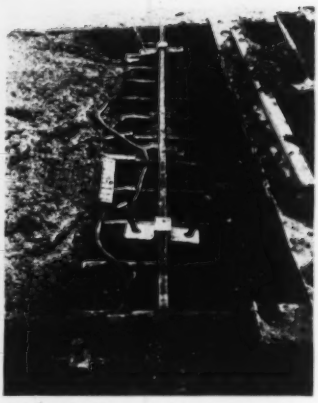
WELDED WIRE FABRIC was cut in strips 18 in. wide by 98 ft. long (top), welded to end terminals wired for low-voltage heat from buried electric cables (center), and laid flat on first pour of concrete pavement (bottom). Top pour gives 1½-in. of concrete insulation for pedestrians. (All photos by Michigan State Highway Department)

Two departures from normal procedure in highway paving were followed in placing the portland-cement concrete. To insure against possible damage to the heating elements placed in the pavement, type 10-A aggregate was specified—which is of slightly smaller size than that permitted in standard Michigan highway paving.

The pavement was placed in two layers. The first layer extended up to within 1¼ in. of the top of the pavement. The heating elements were laid directly on this first pour, following which the remaining 1¼-in. of pavement was added, screeded and finished to complete the pavement. This 1¼-in. layer of concrete, which is a poor conductor of electricity, will serve as an insulator for pedestrians walking on the pavement.

The heating elements in the bituminous pavement were placed directly on the base course of asphalt, followed by 1¼-in. of top course. In placing the top course of asphalt, the rather stiff wire in the heating element became somewhat deformed by trucks operating over it to bring material to the spreader. This caused a springing action in the wire that did not seem to give complete bond between the two courses of bituminous pavement. On future installations of this type, a bond coat probably will be added between the base and top courses.

Cooperating with the Michigan State Highway Dept. in this, its first installation of electrical radiant heating for roadway pavement, is the Detroit Public Lighting Commission, which furnished electrical data, wiring plans and electrical equipment.



HEATING ELEMENTS terminate at contraction joints installed at 100-ft. intervals. Terminal wiring extends under road forms to underground power cables.

The Denton Construction Co., Detroit, general contractors on the project, installed the portland-cement concrete section of pavement. The asphalt section was placed by the Detroit Asphalt Paving Co., under a sub-contract.

The entire experimental program is under the supervision of Charles M. Ziegler, state highway commissioner. Construction on the project was under the direct supervision of C. H. Brown, metropolitan engineer, for the highway department.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York

General Contract Reference

A reference in the subcontract to the general contract relating to the method and time of payment makes those provisions part of the subcontract. A written agreement may, by reference expressly made thereto, incorporate other written agreements and in the event such incorporation is made, the general agreement and those referred to must be considered and construed as one agreement. In the same way if the reference in the contract to the plans and specifications indicates an intention to incorporate them generally, they become a part of the contract for all purposes. There is no substantial difference between incorporated clauses relating to the method of performance and a clause relating to the time and conditions of payment.[1]

Other references to cases relating to clauses in a subcontract referring to the general contract were given in ENR Dec. 9, 1948, p. 108.

(1) Holbrook v. Fazio, 191 P. 2d 123, District Court of Appeal, First District, Division 2, California, April 1, 1948.

Damages From Delays

The annotations in the cases of H. E. Crook Company, Inc. v. United States, 270 U.S. 4, as reported in 70 L. ed. 438, and United States v. Howard P. Foley, 329 U.S. 64, as reported in 91 L. ed. 44, list numerous cases where contractors were allowed recoveries of damages resulting from delays caused by the following circumstances:

1. Failure to execute a formal contract.
2. Failure to pay instalments.
3. Failure to provide building permit.
4. Failure to provide right-of-way.
5. Failure to provide building site.
6. Failure to furnish materials.
7. Failure to have premises in a state of readiness for contractor's work.
8. Delays caused by other contractors of the contractee.
9. Delays caused by engineers, architects or other agents of contractee.
10. Delay occasioned by change in plans and specifications.
11. Suspension of work at request or order of contractee or resulting from his acts.

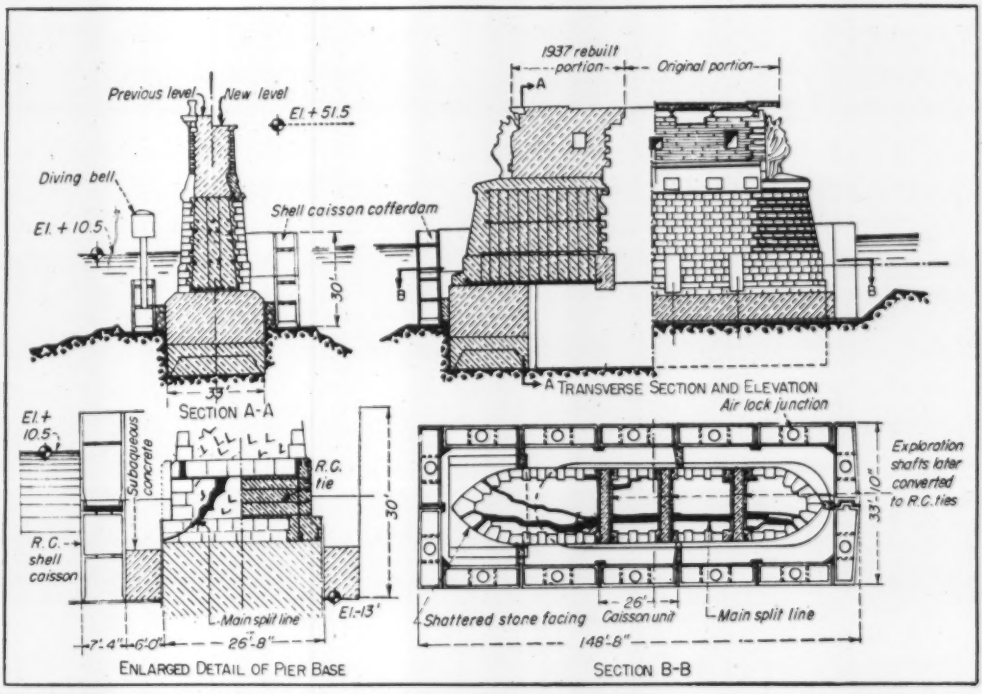
The right to recover damages for delays is conditioned on the contract not containing any provision waiving the right to claim such damages.

Contracts With Municipalities

Information bearing on the rights of contractors under contracts with municipalities in addition to that given in ENR Jan. 6, 1949, p. 74, is found in a decision[1] which states: "It is settled law that within certain limits a contractor who is ordered by the proper representatives of the state to do work which he thinks is not called for by the contract may under protest do as directed and subsequently recover damages on the theory of breach of contract. Gearty v. Mayor, etc. of City of New York, 171 N.Y. 61, 63 N.E. 804; People ex rel Powers & Mansfield Co. v. Schneider, 191 N.Y. 523, 84 N.E. 1118; Borough Construction Co. v. City of New York, 200 N.Y. 149, 93 N.E. 480, 140 Am. St. Rep. 633."

In this case the contract was with the state to furnish labor and materials for a heating plant and contained no definite statement as to whether the contractor was required to remove old piping and appurtenances from concrete tunnels in which they were located. The contract specifically mentioned that the contractor was to remove debris and concrete but did not mention the removal of old piping. The contractor removed the same under protest and was allowed to recover for the reasonable value of the work on the theory of breach of contract.

(1) Novak & Rehner v. State, 78 N.Y.S. 2d 557, 581 Court of Claims of New York.



PNEUMATIC CAISSON UNITS form concrete cofferdam wall around pier hold back Danube River during major repair job.

Repairing Shattered Piers is Key To Budapest Bridge Reconstruction

Famous Margaret Bridge across Danube now restored, with two-hinged steel arch rib spans replacing old hingeless wrought-iron arches of spandrel-braced type.

Ch. Szechy
Highway Bridge Department
Ministry of Transport
Budapest, Hungary

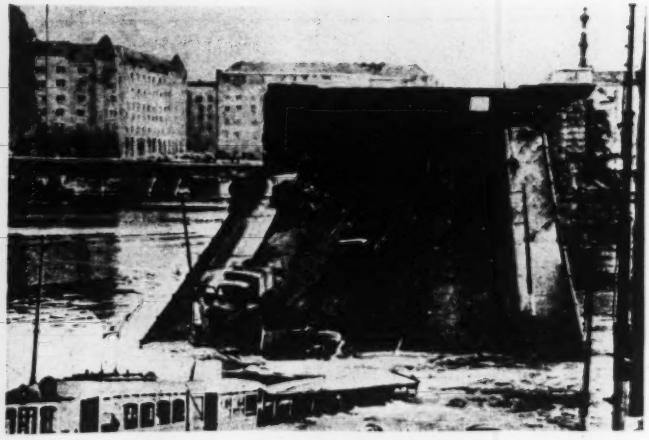
OF THE MANY serious bridge problems facing the twin cities of Buda and Pest after the war, those involved in the reconstruction of the Margaret Bridge have, to date, proved the most difficult.

This is so because the old hingeless wrought-iron deck arches, broken in the center by demolition charges, pulled the upper part of the piers away from the lower part as they collapsed. Serious internal fractures resulted, which had to be repaired by concrete tie beams built through the piers. One of the cofferdams required to encircle the piers to permit this repair work to be done was of an unusual type, assembled from prefabricated concrete caisson wall sections equipped with diving bell shafts.

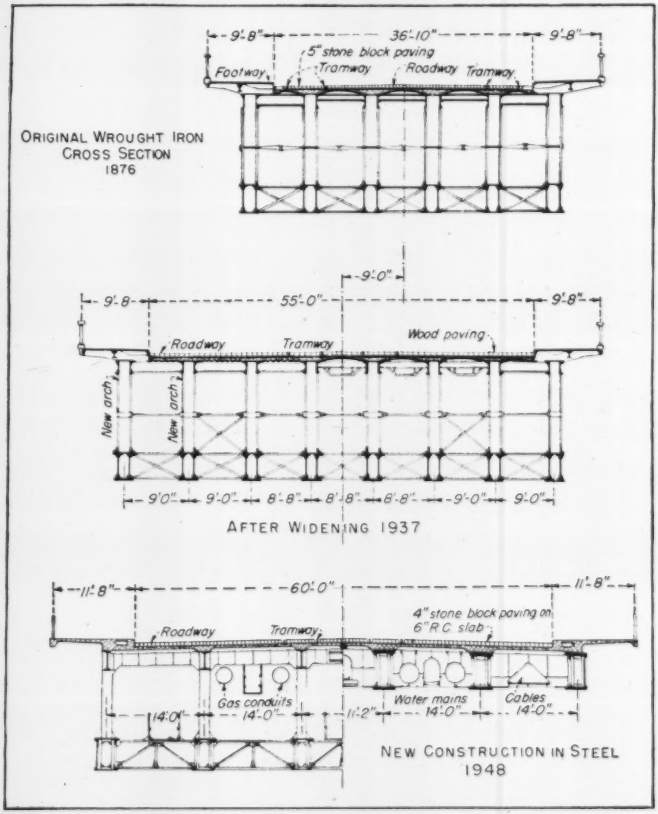
Further interest is attached to the job because the first redesign made utilized Melan-type concrete arch spans reinforced with welded tubular members. Because it weighed 50 percent more than the old wrought iron spans, it had to be abandoned, however, when the serious nature of the pier cracking was discovered. The substituted bridge now nearing completion is of a relatively light design involving steel box arch ribs spans of two-hinged type.

The original Margaret Bridge, built in 1876, crossed the two channels of the Danube River formed by Margaret Island. Either side of an abutment on the island there were three river spans 302,285 and 254 ft. in length. In order to keep the two arms of the bridge perpendicular to their channels, they form a 30 deg. angle with one another at the center abutment from which a ramp leads down to the island. The new bridge, since it utilizes the old piers, follows this same alignment and layout.

The old bridge was widened in 1937 by the addition of two new arches supported on extensions of the piers. (See STRUCTURAL ENGINEER, London, March 1937), and it is this struc-



LARGE LOSS OF LIFE occurred when Pest branch of Margaret Bridge collapsed in 1944 after German demolition charges were accidentally detonated. Falling spans, pulling on piers, cracked them badly.



CROSS-SECTIONS of old and new Margaret Bridges emphasizes comparative lightness of the modern wider-deck design.

ture that was wrecked by the Germans during the war. The Pest branch was blown up by accident, Nov. 4, 1944, under full circulation of traffic, and several hundred persons lost their lives. Demolition of the Buda branch was carried out on Jan. 30, 1945 during the siege of the city. The demolition charges were set at the center of the spans instead of in pier chambers, which accounts for the fact the piers were merely cracked and shattered and not reduced to rubble as would otherwise have been the case. The three progressive cross-sections of the Margaret Bridge are shown in the drawing at the lower left.

Caissons made on shore

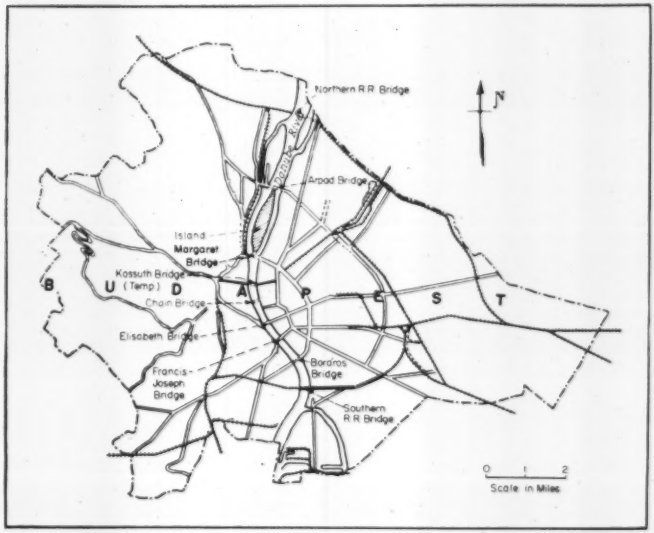
How the most seriously damaged pier was repaired is detailed in Fig. 1. It differs from the other two in that its encircling cofferdam, instead of being of steel sheetpiling, is made up of fourteen reinforced concrete caissons. Each of these caissons, 7 ft., 4 in. thick and 26 ft. long was built ashore, towed to position and sunk by water-ballast after the rip-rap on the river bottom had been evened under a diving-bell. The joints between the individual caissons were made by double planks inserted into grooves in the end walls, and the space between filled with clay and tremie concrete. A tremie concrete seal 5 ft. 7 in. thick was also placed in the cofferdam before it was pumped out.

With the pier base exposed, three horizontal shafts, 4 x 7 ft. in section, were driven through it, revealing the serious internal shattering, including one longitudinal crack 2 ft. wide. The bigger cracks were filled with poured concrete and the smaller ones grouted under 100-lb. pressure. As a final operation, heavy reinforcement was placed in the shafts, and they were tightly poured with concrete to convert them into immense tie-rods that would hold the broken parts of the pier base together.

Care in placing

The foundation work was carried out simultaneously with the erection of the superstructure, and therefore very great care was taken in placing the steel arch ribs so as not to overstrain the damaged piers.

The new steel-construction comprises six two-hinged riveted steel arch ribs for each span supporting, by welded steel posts, the all-welded purlins and cross-beams carrying a 7 in. reinforced concrete slab covered with a 4-in. stone block paving. The bridge was constructed in two halves so that it could be turned over to traffic as early as possible. The southern half was



BUDAPEST'S DANUBE BRIDGES were all destroyed during the war. Franz Joseph and Margaret bridges are now rebuilt, and Arpad, an entirely new structure, will be ready next year. There are also two temporary bridges.

completed a year ago while the northern half has just been opened.

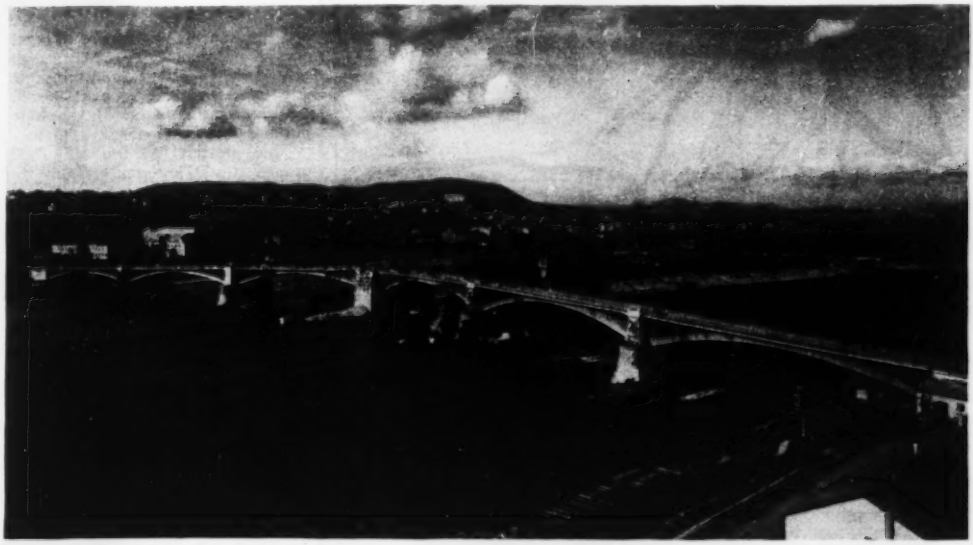
From the fabrication shops the parts were brought to the site and the arch ribs assembled in halves on a simple staging on the river embankment. When all joints were riveted, each half was taken by a floating-crane of 100 tons capacity and put into position on its hinges with the outer end at the middle of the span carried by a temporary trestle. This permitted the crown joint to be accurately adjusted both in vertical and horizontal direction and then riveted. The superstructure on the ribs was placed by a deck traveler.

The hinge levels of the new bridge were lowered, whereas the crown was a bit raised, causing a reduction of the horizontal thrust as compared to the old construction, despite the considerable widening of the roadway and sidewalks. Some 5,000 tons of structural steelwork were required or 65 lb. per sq. ft. as compared to the previous figure of 98 lb. per sq. ft.

Traffic relieved

Completion of the Margaret Bridge supplies much needed traffic relief to the city of Budapest all of whose Danube River bridges—5 highway and 2 railway—were blown up by the German troops, or in one case (that of the new and uncompleted Arpad bridge) damaged by artillery.

Until 1946, when the Franz Joseph suspension bridge was reconstructed, the city was served only by a pontoon bridge, which replaced the Elizabeth Bridge, and a temporary trestle bridge, which replaced the Margaret Bridge. Plans now are to rebuild or replace the famous Clark chain suspension bridge in 1949 and the Nicholas Horthy (now the Boraros bridge) in 1950. In the meantime, depending upon the availability of steel, the continuous girder Arpad Bridge begun in 1939, will be carried to completion.



NEW MARGARET BRIDGE rests on repaired piers of original structure. Half ribs, assembled on river bank falsework (foreground) were set by floating crane. Ribs are riveted, remainder of superstructure welded.

Highway Intersection Designs Analyzed

Robert G. Mitchell
Assistant Highway Engineer
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Hartford, Conn.

A MAJOR interchange design problem is presented by the intersection of the proposed East Hartford-Glastonbury Expressway with the New London Turnpike (Conn. Route 2) southeast of Hartford. This problem centers around the large number of vehicles that ultimately will move through the interchange roadways between Route 2 and the expressway.

As will be seen by the accompanying map, Fig. 1, the expressway will lie east of the old highway running south along the east side of the Connecticut River. Upon its completion, all traffic to and from Route 2 will use the expressway between the intersection and East Hartford. As these vehicles make up a large part of the anticipated expressway traffic, this high percentage of turning traffic has raised the question as to the type of interchange that should be provided and the extent to which additional sums of money should be extended in order to provide a safer and more expeditious means of movement between the two routes.

A report entitled "Proposed Improvement—Glastonbury to East Hartford," recently published by the highway department, established the general layout of the proposed expressway. This report was primarily concerned with the economic evaluation of three alternate routes, and although no individual studies were made at that time of interchange designs, the initial planning proposed a direct connection at the location under discussion. The present study was undertaken to see if a direct connection is justified and if so what should be the general design characteristics.

The location of the study and the traffic volumes involved are so general that it is hoped the results of this study will provide some criteria that may be of value in appraising other interchange locations.

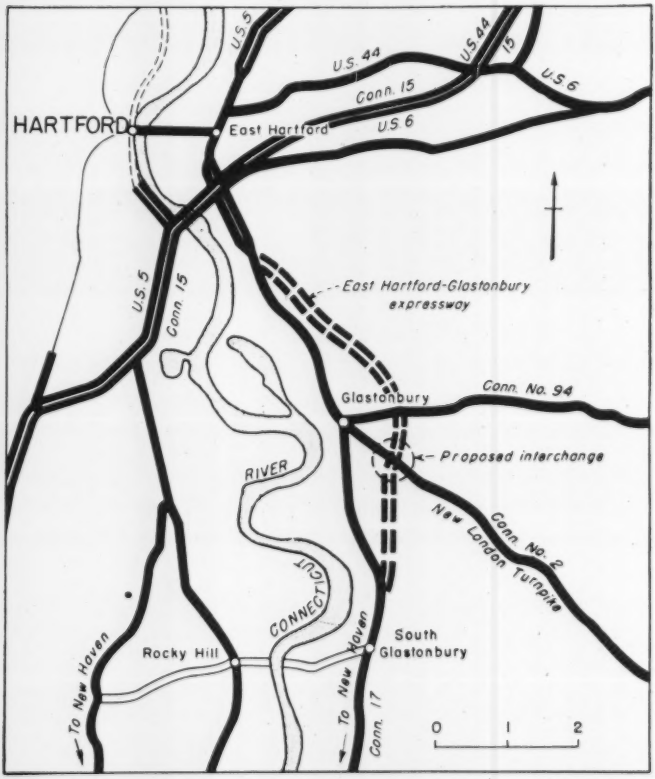


FIG. 1. AN EXPRESSWAY from East Hartford south toward South Glastonbury will require a major interchange where the expressway crosses the New London Turnpike to accommodate the heavy movement of traffic between these two routes.

Traffic characteristics

The traffic volumes shown in Fig. 2 (upper left) are of such magnitude that the ultimate development of the expressway calls for a fully controlled access highway with two 24-ft. concrete roadways separated by a 15-ft. median strip and with two 8 ft. surface-treated shoulders. Cross roads will be separated as to grade.

The major turning movement for which interchange ramps must be provided is the 3,800 vehicles (1,900 in each direction) between the northerly leg of the expressway and the easterly leg of Route 2. Of second importance is the 1,600 daily vehicles moving between the southerly leg of the expressway and the westerly leg of Route 2. The 200 vehicles a day between the westerly leg of Route 2 and the northerly expressway leg is composed of traffic generating in a newly developed business area on Route 2.

The greatest portion of traffic headed for Glastonbury from the north will use access ramps on Route 94. Turning movements between Route 2 on the east and the expressway on the south is negligible due to the presence of several connecting roads which will serve the small volume of traffic between these two directions.

In this particular location the character of the traffic movements is of considerable importance and must be given careful attention in establishing the basic design. Route 2 easterly towards New London is one of Connecticut's primary through routes and will eventually be widened to a four-lane divided highway. Route 2 west of the interchange location is developing into a business section serving the local Glastonbury traffic.

The interchange of traffic between

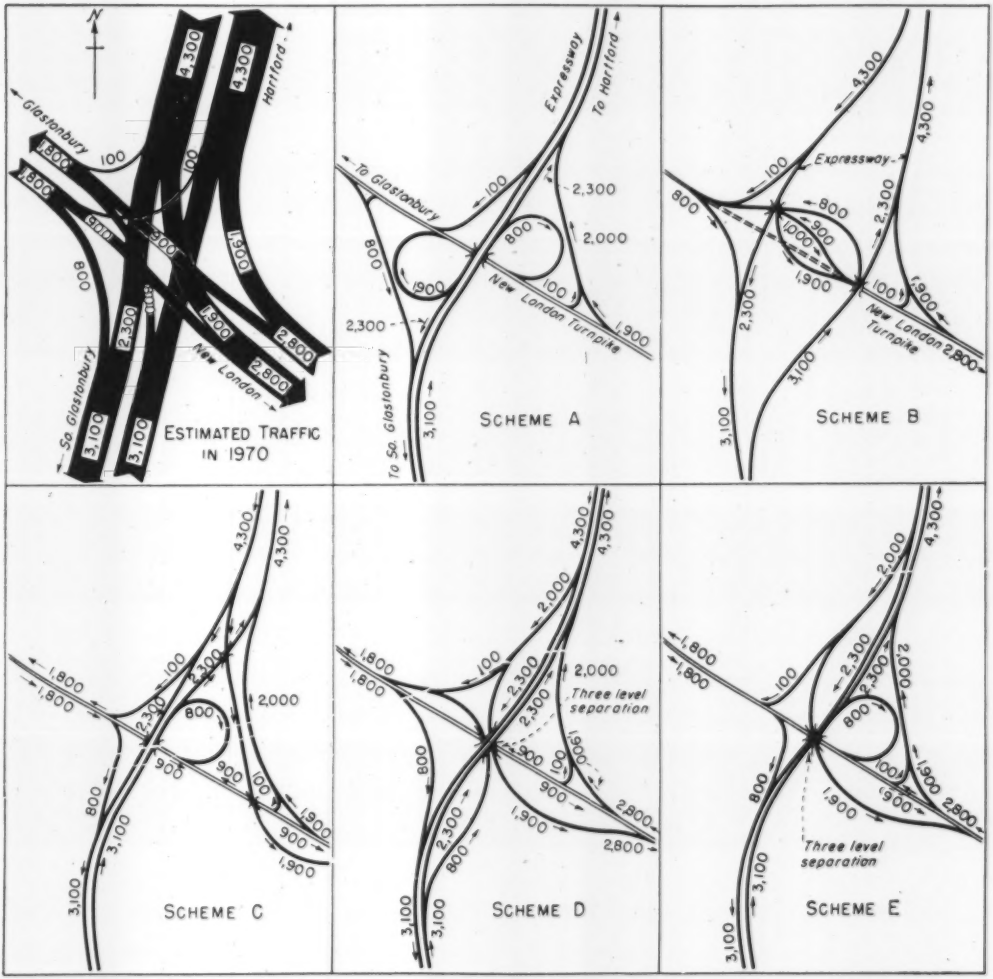


FIG. 2. FIVE INTERCHANGE DESIGNS were developed and compared as to cost and convenience for traffic moving between the expressway and the New London Turnpike—the major traffic movement at the proposed interchange. Traffic volumes anticipated by 1970 are shown graphically in the upper left diagram and by figures on the interchange layouts.

two expressways or two high-speed highways presents an entirely different problem from the interchange or traffic between an expressway and a local street. Even if the traffic volumes were equal, a comparable design would not seem justified for interchange ramps serving two such dissimilar traffic movements.

A number of study sketches were worked up and the general practicability of each layout was evaluated. From this preliminary appraisal five schemes were selected as worthy of extensive investigation. These schemes are shown in Fig. 2.

Scheme A—Semi-cloverleaf
Scheme B—Two-bridge, direct connection
Scheme C—Three-bridge, direct connection
Scheme D—Two - direction, three-level bridge
Scheme E—Single - direction, three-level bridge

TABLE I—CONSTRUCTION AND RIGHTS-OF-WAY COSTS

Scheme	Type of Interchange	Roadway and Structures	Rights-of-Way	Total Cost
A	Semi-Cloverleaf	$573,000	$101,250	$674,250
B	Two-Bridge, Direct-Connection	712,000	254,000	966,000
C	Three-Bridge, Direct-Connection	646,400	127,500	773,900
D	Two-Direction, Three-Level-Bridge	971,550	170,300	1,141,850
E	Single-Direction, Three-Level-Bridge	729,000	128,000	857,000

The operational advantages or disadvantages of the various schemes are readily apparent from the diagrams. Radii on ramps accommodating major left turns vary from 200 ft. on the

cloverleaf ramps to 700 ft. on the three-level-bridge schemes.

A lengthy discourse on the effect of sharp ramp curvature on traffic operation is hardly necessary. Speed, riding comfort, sight distance, capacity, commercial vehicle operation and safety, are all closely related to ramp curvature. The designs with the least abrupt changes in direction are the most advantageous.

The directness of various schemes which permit traffic making a left turn to turn naturally from the left side of the highway, the number of points where merging and diverging take place have also entered into the general appraisal of the schemes.

Although all of these operational features are highly important, they are relatively difficult to transform into a dollars and cents evaluation. The basic method used by the Connecticut Highway Department in ascertaining the value of alternate designs is to relate the initial construction and rights-of-way costs to the traffic benefits resulting from savings in vehicle operation due to decreases in travel distance and savings to motorists by reductions in travel time on the various schemes. Such a method was followed in this alternate interchange study.

Construction and travel costs

In computing the construction and rights-of-way costs current prices were used. Roadway construction costs include grading, drainage, pavement, and interchange ramps. The computed amounts for each of the five schemes are given in Table I.

On each interchange scheme there is a definite travel distance for each movement of traffic between the fixed limits, which were set at points corresponding with the margins of the sketches in Fig. 2. Thus, the vehicle miles of travel on each interchange scheme can be computed. Further, depending on the operating speeds on the various radii of the interchange ramps, the time to traverse each line expressed in vehicle minutes of travel time may be evaluated.

In a report entitled "Alternate Location Study of Routes 8 and 65 in Ansonia-Derby-Shelton", published by the Connecticut Highway Department in 1943, a complete analysis was made of the basic data on operating costs and time costs for motor vehicle travel. The annual mileage costs and time costs developed in that report, based on prewar values, are very similar to findings obtained by other agencies that have done research work on the economies of highway travel. As soon as prices and wages become stabilized

TABLE II—COMPUTATION OF ANNUAL TRAVEL COSTS FOR EACH OF FIVE INTERCHANGE SCHEMES

Travel (Direction of Flow)	Average Traffic During 30-Year Period	Distance of Line (Miles)	Daily Vehicle Miles	Time to Traverse Line (Minutes)	Daily Vehicle Minutes
SCHEME A SEMI-CLOVERLEAF DESIGN					
So. Glastonbury to Hartford	2,150	0.748	1,608	1.00	2,150
Hartford to So. Glastonbury	2,150	0.748	1,608	1.00	2,150
Hartford to New London	1,760	0.965	1,698	1.61	2,834
New London to Hartford	1,760	0.593	1,044	0.92	1,619
So. Glastonbury to Glastonbury	720	0.777	559	1.38	994
Glastonbury to So. Glastonbury	720	0.424	305	0.61	439
New London to Glastonbury	960	0.457	439	0.79	758
Glastonbury to New London	960	0.457	439	0.79	758
Hartford to Glastonbury	100	0.608	61	0.93	93
Glastonbury to Hartford	100	0.835	84	1.32	132
Totals			7,845		11,927
Costs: Distance = 7845 × $15 = $117,700; Time = 11,927 × $5 = $59,600; Total = $177,300					
SCHEME B TWO-BRIDGE, DIRECT-CONNECTION DESIGN					
So. Glastonbury to Hartford	2,150	0.756	1,625	1.01	2,172
Hartford to So. Glastonbury	2,150	0.753	1,619	1.00	2,150
Hartford to New London	1,760	0.729	1,283	1.16	2,042
New London to Hartford	1,760	0.586	1,031	0.81	1,426
So. Glastonbury to Glastonbury	720	0.595	428	0.98	706
Glastonbury to So. Glastonbury	720	0.439	316	0.63	454
New London to Glastonbury	960	0.477	458	0.87	835
Glastonbury to New London	960	0.477	458	0.87	835
Hartford to Glastonbury	100	0.537	54	0.77	77
Glastonbury to Hartford	100	0.852	85	1.32	132
Totals			7,357		10,829
Costs: Distance = 7,357 × $15 = $110,400; Time = 10,829 × $5 = $54,100; Total = $164,500					
SCHEME C THREE-BRIDGE DIRECT-CONNECTION DESIGN					
So. Glastonbury to Hartford	2,150	0.751	1,615	1.00	2,150
Hartford to So. Glastonbury	2,150	0.739	1,589	0.99	2,129
Hartford to New London	1,760	0.610	1,074	0.86	1,514
New London to Hartford	1,760	0.571	1,005	0.76	1,338
So. Glastonbury to Glastonbury	720	0.753	542	1.38	994
Glastonbury to So. Glastonbury	720	0.478	344	0.76	547
New London to Glastonbury	960	0.457	439	0.79	758
Glastonbury to New London	960	0.457	439	0.79	758
Hartford to Glastonbury	100	0.605	61	0.92	92
Glastonbury to Hartford	100	0.890	89	1.42	142
Totals			7,197		10,422
Costs: Distance = 7,197 × $15 = $108,000; Time = 10,422 × $5 = $52,100; Total = $160,100					
SCHEME D TWO-DIRECTION THREE-LEVEL-BRIDGE DESIGN					
So. Glastonbury to Hartford	2,150	0.750	1,613	1.00	2,150
Hartford to So. Glastonbury	2,150	0.750	1,613	1.00	2,150
Hartford to New London	1,760	0.710	1,250	1.01	1,778
New London to Hartford	1,760	0.595	1,047	0.83	1,461
So. Glastonbury to Glastonbury	720	0.516	372	0.81	583
Glastonbury to So. Glastonbury	720	0.452	325	0.67	482
New London to Glastonbury	960	0.457	439	0.79	758
Glastonbury to New London	960	0.457	439	0.79	758
Hartford to Glastonbury	100	0.580	58	0.81	81
Glastonbury to Hartford	100	0.805	81	1.26	126
Totals			7,237		10,327
Costs: Distance = 7,237 × $15 = $108,600; Time = 10,327 × $5 = $51,600; Total = $160,200					
SCHEME E SINGLE-DIRECTION, THREE-LEVEL-BRIDGE DESIGN					
So. Glastonbury to Hartford	2,150	0.750	1,613	1.00	2,150
Hartford to So. Glastonbury	2,150	0.750	1,613	1.00	2,150
Hartford to New London	1,760	0.710	1,250	1.01	1,778
New London to Hartford	1,760	0.586	1,031	0.81	1,426
So. Glastonbury to Glastonbury	720	0.788	567	1.35	972
Glastonbury to So. Glastonbury	720	0.488	351	0.76	547
New London to Glastonbury	960	0.457	439	0.79	758
Glastonbury to New London	960	0.457	439	0.79	758
Hartford to Glastonbury	100	0.594	59	0.93	93
Glastonbury to Hartford	100	0.824	82	1.29	129
Totals			7,444		10,761
Costs: Distance = 7,444 × $15 = $111,700; Time = 10,761 × $5 = $53,800; Total = $165,500					

TABLE III—EVALUATION OF THE DESIGNS ON THE BASIS OF TOTAL ANNUAL COST

Scheme	Travel	Construction & Rights-of-Way	Total	Rank
A	$177,300	$22,500	$199,800	4
B	164,500	32,200	196,700	3
C	160,100	25,800	185,900	1
D	160,200	47,300	207,500	5
E	165,500	28,600	194,100	2

a reappraisal of these values will be made.

For this study, an arbitrary increase of 25 percent was added to the previously mentioned travel costs to cover increases in the cost of repairs, gasoline, oil, etc. and the increase in truck drivers wages. Unquestionably a 25 percent increase above prewar costs is a conservative figure. The values used in this study are:

Annual mileage cost = $15.00 per daily vehicle-mile, which amounts to about 4c. per mile.

Annual time cost = $5.00 per daily vehicle-minute, or about one-third of a cent per minute.

Other costs relative to such items as rise and fall, gradient, elimination of stop signs and traffic signals, fuel consumption due to acceleration and deceleration, were not developed in this study.

Travel and construction costs compared

In relating travel costs to construction costs the Connecticut Highway Department uses a 30-year period. This 30-year period represents the length of time arbitrarily established for amortization of the initial construction and rights-of-way costs. It is a conservative figure for facilities of the character here being considered.

Combining the travel costs and the annual construction and rights-of-way costs (annual costs = *initial* costs ÷ 30) the total cost to the motorists can be obtained on each scheme. These are shown in Table III.

The annual cost tabulations show that Scheme C, the three-bridge, direct connection, would have the greatest economic value, for although it would cost more than the cloverleaf design to construct, it would develop the lowest travel costs.

Scheme C favored

The three-bridge, direct connection, Scheme C, is unquestionably the most efficient design of the five alternate layouts that were studied. It can be constructed at only a small increase in cost above the least expensive design. It has been estimated that the three-bridge, direct-connection interchange can be constructed for $773,900 or approximately $100,000 (16 percent) more than the semi-cloverleaf.

Three-quarters of a million dollars may seem high for one intersection but the costs include not only the bridges and ramps but a considerable length along the main line within the interchange area which normally is not charged against the cost of an intersection. Because the area where the interchange must be located is developed land occupied by houses, barns and some commercial buildings, land costs are high.

Scheme C would also lend itself well to stage construction as the ramps serving traffic between Route 2 on the east and the expressway on the north, which is the largest turning movement could be constructed first, leaving all of the construction to the south for the second stage.

Alignment, grades and sight distances will serve well the volumes of traffic on the various ramps. The one cloverleaf loop, with a minimum radius of 180 ft., will only have to handle an estimated 800 vehicles a day in 1970. This circular ramp will force the traffic leaving the expressway to slow down before reaching the Glastonbury business center. The heavier traveled ramps will all have better alignment.

Based mainly on its superior traffic service it has been recommended that Scheme C, the three-bridge, direct-connection interchange be constructed.

Purchase of right-of-way for the expressway began in 1948, and the first contracts for construction will be advertised early this year. It will be built by the State Highway Department under G. Albert Hill, commissioner, and R. E. Jorgensen, deputy commissioner and chief engineer. Curtis J. Hooper, director of highway planning studies, supervised the studies described in this article.

How to Prevent Rot in Timber Floors

Under certain conditions, most species of timber used in floors are subject to "dry rot." Caused by an attack of fungi, this outbreak may result in severe structural damage. It may be avoided either by using timber possessing a natural high resistance to dry rot; such as, Canadian Western red cedar, California redwood, or yellow cedar, or by taking elementary and relatively inexpensive precautions in construction.

Some suggestions for the latter alternative are given briefly in Building Research Station Digest No. 1, "The Design of Timber Floors to Prevent Dry Rot," issued by the Director, Building Research Station, Garston, Watford, Herts, England.

Stressing the use of sound, well-seasoned timber only, the pamphlet points out that it is most important that the construction should afford adequate protection against moisture, for the moisture content of timber must be kept below 20 percent, oven-dry weight, for the wood to be immune from attack. Ground moisture should be prevented from rising into the building by including at an appropriate position in the structure a layer impervious to water in both the liquid and vapor forms.

Even good concrete, the pamphlet notes, is slightly permeable and will become damp when in contact with moist ground. However, a layer of hard broken stone under the concrete will do much to break the capillary path, but all fine material must be eliminated.

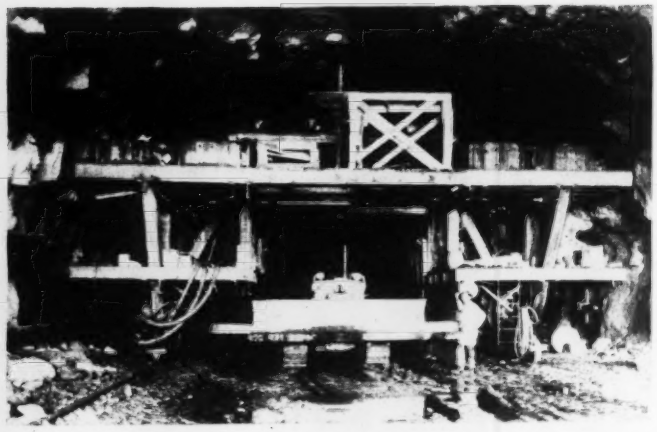
On the other hand, layers of materials such as asphalt and bitumen, the pamphlet claims, can provide a barrier completely impervious to moisture. Where an unbroken and sufficiently thick dampproof course of a material of this type is provided, timber may be fixed safely in contact with it. Concrete acts with such materials chiefly as a solid base for the impervious course and the floor finish.

The risk of attack may be eliminated or greatly reduced by the use of a suitable preservative. Such treatment, according to the pamphlet, should be regarded as providing an extra margin of safety.

When timber flooring is to be fixed by an adhesive to a concrete subfloor, use of a bituminous adhesive at least ¼ in. thick will automatically provide an efficient dampproof layer. When flooring is nailed to concrete that is in contact with the ground, an impervious layer between the boards and concrete should cover the whole floor, making a watertight joint with the dampproof course in the walls. Bitumen (penetration No. 40 or 50, or softening point 50 to 55 deg. C.) or a soft pitch (softening point 35 to 45 deg. C.) for this layer should be poured hot to a thickness of at least ¼ in. (5 or 6 gal. per 100 sq. ft.).

The same precautions should be taken for partially suspended floors, in which the boards span between nailing strips laid on top of a concrete subfloor that is in contact with the ground. Suitable provision for securing the nailing strips to the subfloor should be made when the concrete is placed, preferably by embedding clips before the concrete sets.

Precautions to be taken with completely suspended floors were pointed out in an article on "Crawl Spaces," by Ralph R. Britton, in Bulletin No. 2 of the U. S. Housing and Home Finance Agency, Washington 25, D. C., Jan. 1948.



Three-deck jumbo drives a 28x48-ft. top drift in . . .

Downsville Dam Diversion Tunnel

EXTRAORDINARY precautions against carbon-monoxide poisoning were taken in driving the Downsville Dam diversion tunnel, where mucking and hauling was done by diesel equipment. This feature plus the fact that the tunnel cross section is a 40-ft. diam. circle, makes the job one of the notable construction operations in the East.

Downsville Dam, in the Delaware River watershed, more than 100 miles northwest of New York, is one of three dams that will impound supplementary water for the New York City supply (ENR January 6, p. 60). The tunnel is 2,155 ft. long. A top drift, full length from east to west portals, was holed through in November, 1948, and bench excavation was completed the next month.

In addition to installing ample ventilating equipment in the tunnel, the contractors equipped most tunnel machines with oxygen admixture systems to enrich any carbon monoxide discharges and thus convert the gas into harmless carbon dioxide. The machines included a 2-yd. diesel shovel with a short boom (15½ ft.) and six 9.7-yd. diesel rear-dump trucks. (Electric power also was used for mucking).

The admixture system is simple. A tube from a standard oxygen bottle in the cab leads to a regulating valve on the dash. One tube from each cylinder runs from the regulating valve to a flow indicator under the hood, then to orifices tapped in the exhaust manifold opposite each cylinder exhaust port. The flow indicator is a transparent vertical tube with a ball inside. Oxygen enters at the bottom and leaves at the top; if the line is venting oxygen the ball "floats" in the tube.

In practice, two oxygen bottles were carried in the cab, so that the second could be cut in when the first was exhausted. A bottle lasted about one 8-hour shift.

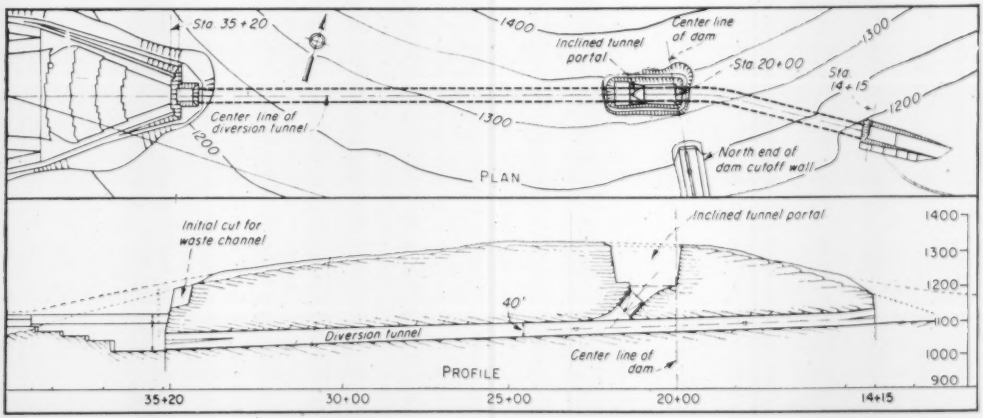
Machines used intermittently in the tunnel did not have admixture systems. These were a tractor-mounted front-loader and a bulldozer, both used for invert clean-up. The bulldozer also was used for miscellaneous hauling, which during top drift excavation included moving the drill carriage.

Driving the tunnel

The drill carriage used was designed to work a horseshoe face, from arch down to 5 ft. below the springing line. To the pavement line, the drift is 27 ft. 6 in. high and 45 ft. wide, though in sections where ground support is required, necessary width is 48 ft. 1 in. The bench was removed by open cutting methods (wagon drills, etc.).

The carriage mounted 18 drills, seven at the bottom, four on the first and second decks and three on the top deck. It is 44 ft. 6 in. long, 38 ft. 6 in. wide, and weighs 55 tons bare. This weight plus equipment and four crawler-track tail-weights is carried through eight roller-bearing double-flanged wheels to 90-lb. rails, spaced 27 ft. 6 in. apart.

The lowest deck of the carriage is



LOCATION AND PROFILE of Downsville diversion tunnel. When dam is completed the tunnel will be plugged above its intersection with the inclined shaft and the lower portion will become part of the spillway.

open at the center, leaving about 14 ft. headroom. Hinged platforms 4 ft. wide lowered into part of this space during drilling. Raised, these platforms left a 14-ft. wide passage for the mucking shovel and trucks. A removable transverse beam just above the jumbo axle level stiffened the structure somewhat during drilling, and transmitted tractive power from the bulldozer when the carriage was moved.

Drilling and blasting

Rock in the tunnel is medium-grained Graywacke sandstone in level strata, with some shale. Drills for the drift had 4-in. bore and 4-ft. feed, using 1¼-in. rods with detachable bits graduated in eighths from 2¾ in. to 2¼ in., 4 ft. to a reduction. The contractor drilled 18 ft. to pull 16½ to 17 ft. For a round, about 170 holes were loaded with 2600 lb. of 2-X Gelamite, in 1¼x8-in. sticks. The job took about 4½ lb. of powder for each yard blown. Electric blasting caps of zero and 12 delays fired the holes.

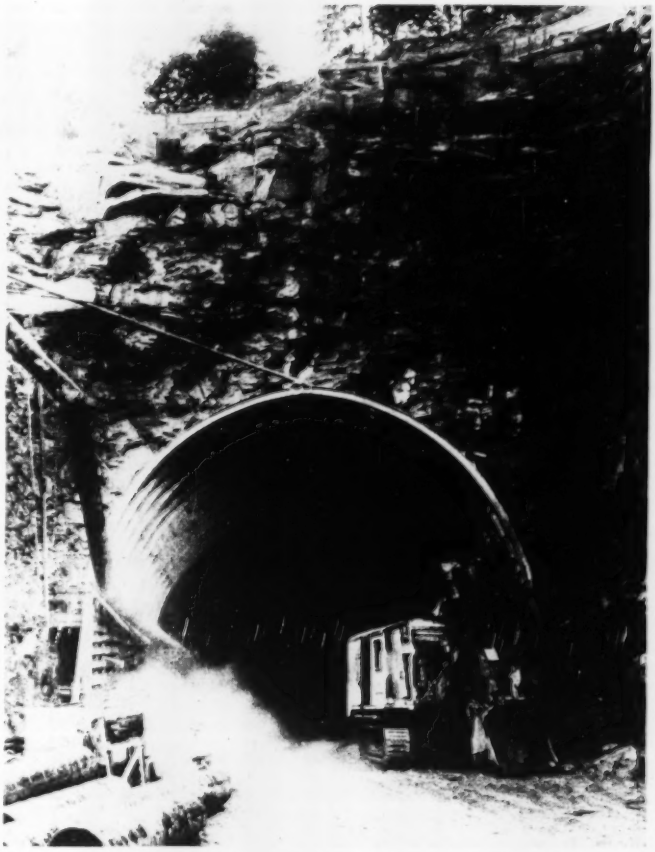
The 440-volt shooting line was carried along the left rib on the opposite side from the power lines. When a round was ready the shooting line was hooked up to the caps at the face. Two locked-open safety switches were used at the portal, one on each rib, and connected when ready for a blast by a portable plug-in cable carried across the tunnel. When the heading was clear the blasting foreman, the only possessor of a switch key, unlocked the main switch on the right rib and closed the circuit, lighting an indicator lamp on the switch. The second or firing switch was then unlocked and the switch closed, lighting indicator lamps on that switch momentarily, to fire the round.

For mucking, the shovel moved through the jumbo to the face and loaded rock into the oxygen-equipped tunnel trucks, which hauled the material to the upstream toe of the dam.

Ground support

About 50 percent of the tunnel required ground support. Ribs are 10x8-in. 45-lb. WF section, bent to a 24-ft. 7-in. radius. Two sections join at the top of the arch and bear at each side on two parallel 12-in. 41-lb. I-beam wall plates, 24-in. above the springing line. The wall plates are carried by timber posts, which bear on mud sills. Angle bars at every 7 ft. 3 in. of rib circumference space the ribs on 4-ft. centers. Six-inch channel lagging is clamped to the inside rib flanges wherever needed.

Little groundwater was encountered. As the work was on a downhill grade, storm waters created a minor and intermittent problem. At the portal, a 4-in. 20-hp. electric pump rated at 570 gpm. against 100 ft. head, sucked water from sumps in the tunnel. This pump also took the discharge from air-operated sump and sludge pumps at the face.



NO CARBON MONOXIDE came from this stubby-boom 2-yd. shovel when it worked in the heading. An oxygen-injection system changed the deadly gas to CO_2.

Services to tunnel work included a 2-in. line for drilling water, a 6-in. compressed air line and two 24-in. steel exhaust lines, one on each wall. Ventilating air came from two blowers above ground, rated at 17,300 cfm. each, and a booster blower in the tunnel rated at 20,000 cfm.

Compressed air equipment above ground included two electrically-driven compressors totalling 4,200 cfm. In the heading, hoses from the 6-in. supply line fed an air receiver, which was mounted on the jumbo during top heading work.

Open cut to expose the portal face began in March, 1948. In April tunneling got under way, although the jumbo was not fully erected until mid-May. Once work narrowed to standard tunnel size, the contractor hit his stride, by August averaging one 16-ft. shot per three-shift 24-hr. day. Concreting began in January, with completion scheduled for May 1, 1949.

Downsville Dam is being built by the New York City Board of Water Supply, John M. Fitzgerald, chief engineer. N. LeRoy Hammond is Western department engineer and B. J. Sullivan is Downsville division engineer. For Walsh Construction Co. and B. Perini & Sons, Inc., John S. Macdonald is project manager, John J. Murphy is tunnel superintendent, A. J. Allio is project engineer and Clancy O'Dell is tunnel superintendent. The drill carriage was fabricated by Eureka Shipbuilding Corp., Newburgh, N. Y., and erected by Walsh-Perini.

The BOCA Plan for Better Codes

George E. Strehan

Consultant, Building Officials Foundation
New York, N. Y.

A GREAT DEAL of adverse criticism is being directed at building codes for their failure to meet present-day construction needs. While much of this condemnation is unwarranted, some shortcomings do exist in most codes and in their administration. These drawbacks stem from three principal defects: Lack of flexibility of the prevalent specification-type codes, lack of uniform requirements across the country, and overlapping of authority in duplicating enforcement agencies.

The remedy is to be found, in the writer's opinion, in the plan and basic code that has been developed after more than three years of intensive effort by the Building Officials Conference of America, Inc. The program will function through the machinery of the Building Officials Foundation, set up as an integral part of BOCA to establish:

1. A basic performance-type code, supplemented by a construction code of detailed rules and specifications.
2. Standard procedures for tests of building materials and equipment and for their interpretation and application.
3. A central clearing house for the interpretation of test data and research to which all building officials can resort for solution of problems in code administration.

Code requirements vary

A building code is basically a local statute, authorized under the police power of the state, by which a municipal entity insures public safety against the structural, fire and health hazards incidental to building construction. Ordinarily, it is not concerned with esthetic, economic or superior-quality standards, except as they are necessary for safety.

These codes legally can only specify the minimums essential to insure safety. Yet, codes of various municipalities are not in conformity with general good practice and frequently include special-privilege requirements that exceed such minimums. What is acceptable in one locality is prohibited in an adjacent one.

As an example of the conflicts—not only nationwide but within individual states—New York State today has no less than 178 current building codes in force—most of them restrictive, inflexible, conflicting and prejudicial to good practice. Of the 540 civic groups in the state with population over 1,000, the majority function without any building code. This situation is more or less duplicated 48 times throughout the United States (ENR Dec. 2, p. 7). The control of building operations is thus either haphazard or discriminatory.

Although many municipalities are clamoring for new codes, the hiring of expert services, the elaborate legal procedure involved, the required public hearings and repetitive printing of original and amended drafts entail a prohibitive investment for most communities.

The BOCA–BOF program was designed to remedy this situation. It seeks to secure uniform approval of materials and uniformity in building code requirements and their administration throughout the country and thus bring about uniform building practices. This will lead to the economical advantages of mass production, manufacture and distribution of building materials on a national scale.

The basic code

The basic building code of the BOCA is founded on functional standards, in so far as practicable, and establishes minimum safety requirements as determined by inherent structural, fire and sanitary hazards. However, the present draft is not a simon-pure performance-standards code. During the transition period between abandonment of the specification-type code and adoption of the new type, some mandatory provisions have had to be incorporated.

When fully operative—along with a planned construction code, structural bureau, monthly bulletin and news letter—the basic code will differ from the general run of specification codes and present model codes in this manner:

Buildings will be posted for floor load, occupancy load, use group and fire load.

The code will classify use groups by inherent fire and life hazard, based on available performance records reported in the QUARTERLY of the National Fire Protection Association. It will recommend a graduated scale of height and area limitations of buildings, to secure a uniform degree of fire hazard in accordance with the anticipated degree of fire severity in each use group and the factual time-temperature performance of the type of construction.

The code will provide for a controlled-materials procedure applying to all materials, giving unhampered freedom to responsible designers within the limitations of accepted engineering practice.

It will also provide for reduction of the fire-resistive requirements for the elements of the structure to the minimum essential for life safety, rather than the ultimate conceivable. The idea here is that requirements that are too rigid retard the use of fire-safe construction.

The fire-load factor for each use group—expressed in hours of equivalent time-temperature performance—will control the design of fire division walls, segregation of mixed-use groups and fire-separation of buildings based on exterior fire exposure.

The code will include adequate controls to meet the introduction of new devices and innovations in equipment, such as moving stairways, revolving doors and hazardous processes of air conditioning and refrigeration. It will also incorporate a rational approach to structural requirements, including design of walls, foundations, chimneys, flues and prefabricated structural and mechanical assemblies based on performance standards.

Recognition is given to the need for supplemental means of emergency fire ventilation. More than half the number of people killed daily in fires in the United States die from asphyxiation. The code specifies emergency ventilation for buildings and automatic ventilation of shaftways and exitways to safeguard against the dissemination of toxic gases, smoke and hot lethal air from fires.

Finally, the basic code will provide a means of coordinating and concentrating authority, under one executive head, in the administration of all laws governing the erection and equipment of buildings.

Code abridged

To meet an immediate and urgent demand in the 16,752 cities, towns and other civic communities that now have no code at all—or one long outdistanced by progress—the BOCA has prepared an abridged (ABC) building code. Expressed in simpler terms but

in sufficient detail to establish desired minimums of approved construction, the ABC document has sufficient flexibility to provide an open door to all satisfactory materials and methods. Its scope, however, is limited to buildings not exceeding three stories, or 40 ft. in height, thus covering the range of construction common in such communities.

While not departing from basic performance principles, the abridged code includes tables of details covering many traditional forms of construction common in smaller communities. A complete tabulation of time-temperature performance data of all common materials and assemblies furnishes the fire resistive ratings necessary to apply the basic requirements of the code.

Construction code

The construction code, mentioned previously, supplements the basic code and the abridged code. It is planned as a loose-leaf manual of detailed rules constantly in flux, not included in the statutory requirements but kept up to date with developments in the industry. The standing basic-code committee of the BOCA, working with the technical staff of the BOF, will keep the specifications for new materials and methods in step with technological development and in proper relation to the requirements of the basic building code.

With the BOF structural bureau in action, building officials no longer will have cause to be reluctant to consider new and only partially proved techniques. Also, the readily available solution provided by the bureau of special problems incident to prevailing temperature, winds, rain, snow, seismic disturbances and other special physical and geographic characteristics will be of significant benefit in establishing uniformity.

Specific provisions

In its classification of types of construction, the basic code follows the general recommendations of the American Standards Association and the National Bureau of Standards, except as to the use of the term "fireproof" to apply to the highest type of fire-resistive building.

The code also recognizes the trend toward lighter forms of construction particularly applicable to housing. For example, it provides for unprotected steel buildings and other light structural frames of wood, gypsum, reinforced concrete, molded plywood and plastics that do not meet the traditional time-temperature performance requirements of existing buildings codes but provide adequate safety for residential and other use groups of relatively low fire hazard.

The traditional 1-hr. and 2-hr. requirements for buildings now variously designated "fire protected" and "semi-fireproof" in existing codes are inconsistent with factual fire-resistive test data. Weight of evidence is in favor of the less rigid ¾ and 1½-hr. standards to secure fire safety without sacrificing economy, and the code permits these

GENERAL HEIGHT AND AREA LIMITATION

AREAS IN SQ. FT. FOR ONE-STORY BUILDING FACING ON STREET OR PUBLIC SPACE NOT LESS THAN 30 FT. WIDE

	Use Factor	Use Group	Fireproof		Incombustible			Exterior Masonry Walls			Frame	
					Protected		Unprotected	(H. T.) Mill	Ordinary (Joisted)		Protected	Unprotected
									Protected	Unprotected		
		Construction Factor—	1A 7	1B 5½	2A 3½	2B 2½	2C 1½	3A 2¾	3B 2	3C 1¾	4A 1½	4B 1
A	2	High Hazard	58ft. 65ft. 14,000	38ft. 40ft. 11,000	38ft. 40ft. 7,000	28ft. 30ft. 5,000	18ft. 20ft. 3,000	28ft. 30ft. 6,000	28ft. 30ft. 4,000	18ft. 20ft. 3,500	18ft. 20ft. 3,000	Not permitted
B-1	3½	Storage—Moderate	128ft. 135ft. 25,000	58ft. 65ft. 20,000	58ft. 65ft. 12,000	48ft. 50ft. 9,000	28ft. 30ft. 5,000	48ft. 50ft. 9,000	38ft. 40ft. 7,000	28ft. 30ft. 6,500	28ft. 30ft. 5,000	18ft. 20ft. 3,500
B-2	6	Storage—Low	Unlimited	188ft. 215ft. 33,000	78ft. 85ft. 21,000	58ft. 65ft. 15,000	38ft. 40ft. 9,000	58ft. 65ft. 16,500	48ft. 50ft. 12,000	38ft. 40ft. 11,000	38ft. 40ft. 9,000	28ft. 30ft. 6,000
C	4	Mercantile	208ft. 250ft. 28,000	128ft. 135ft. 22,000	68ft. 75ft. 14,000	48ft. 50ft. 10,000	28ft. 30ft. 6,000	48ft. 50ft. 11,000	38ft. 40ft. 8,000	28ft. 30ft. 7,500	28ft. 30ft. 6,000	18ft. 20ft. 4,000
D	4	Industrial	Unlimited	128ft. 135ft. 22,000	68ft. 75ft. 14,000	48ft. 50ft. 10,000	28ft. 30ft. 6,000	48ft. 50ft. 11,000	38ft. 40ft. 8,000	28ft. 30ft. 7,500	28ft. 30ft. 6,000	18ft. 20ft. 4,000
E	6	Business	Unlimited	188ft. 215ft. 33,000	78ft. 85ft. 21,000	58ft. 65ft. 15,000	38ft. 40ft. 9,000	58ft. 65ft. 16,500	48ft. 50ft. 12,000	38ft. 40ft. 11,000	38ft. 40ft. 9,000	28ft. 30ft. 6,000
F-1A	2	Assembly Theatres: With stage and scenery	Unlimited	68ft. 75ft. 11,000	48ft. 50ft. 7,000	28ft. 30ft. 5,000	18ft. 20ft. 3,000	28ft. 30ft. 6,000	28ft. 30ft. 4,000	18ft. 20ft. 4,000	18ft. 20ft. 3,000	Not permitted
F-1B	3½	Assembly Theatres: Without stage (Motion Picture Theatres)	Unlimited	98ft. 100ft. 20,000	58ft. 65ft. 12,000	38ft. 40ft. 9,000	28ft. 30ft. 5,000	38ft. 40ft. 10,000	28ft. 30ft. 7,000	28ft. 30ft. 6,500	18ft. 20ft. 5,000	18ft. 20ft. 3,500
F-2	1	Assembly—Restaurants Night Clubs	Unlimited	48ft. 50ft. 6,000	38ft. 40ft. 4,000	28ft. 30ft. 2,500	18ft. 20ft. 1,500	28ft. 30ft. 3,000	28ft. 30ft. 2,000	18ft. 20ft. 2,000	18ft. 20ft. 1,500	18ft. 20ft. 1,000
F-3	3½	Assembly—Recreation Centers Lecture Halls Terminals	Unlimited	98ft. 100ft. 20,000	58ft. 65ft. 12,000	38ft. 40ft. 9,000	28ft. 30ft. 5,000	38ft. 40ft. 10,000	38ft. 40ft. 7,000	28ft. 30ft. 6,500	18ft. 20ft. 5,000	18ft. 20ft. 3,500
F-4	4	Assembly—Churches Schools	Unlimited	98ft. 100ft. 22,000	58ft. 65ft. 14,000	38ft. 40ft. 10,000	28ft. 30ft. 6,000	38ft. 40ft. 11,000	38ft. 40ft. 8,000	28ft. 30ft. 7,500	18ft. 20ft. 6,000	18ft. 20ft. 4,000
H-1	2½	Institutional—Restrained	108ft. 110ft. 17,500	68ft. 75ft. 15,000	48ft. 50ft. 9,000	28ft. 30ft. 6,000	18ft. 20ft. 3,500	28ft. 30ft. 7,500	28ft. 30ft. 5,000	18ft. 20ft. 5,000	18ft. 20ft. 3,500	Not permitted
H-2	3	Institutional—Incapacitated	128ft. 135ft. 21,000	88ft. 90ft. 17,000	48ft. 50ft. 10,000	28ft. 30ft. 7,500	18ft. 20ft. 4,500	28ft. 30ft. 8,000	28ft. 30ft. 6,000	18ft. 20ft. 6,000	18ft. 20ft. 4,000	Not permitted
I-1	4	Residential—Hotels	Unlimited	128ft. 135ft. 22,000	98ft. 100ft. 14,000	48ft. 50ft. 10,000	38ft. 40ft. 6,000	48ft. 50ft. 11,000	48ft. 50ft. 8,000	38ft. 40ft. 7,500	38ft. 40ft. 6,000	2½ft. 35ft. 4,000
I-2	4	Residential—Multi-Family	Unlimited	128ft. 135ft. 22,000	98ft. 100ft. 14,000	48ft. 50ft. 10,000	38ft. 40ft. 6,000	48ft. 50ft. 11,000	48ft. 50ft. 8,000	38ft. 40ft. 7,500	38ft. 40ft. 6,000	2½ft. 35ft. 4,000
I-3	4	Residential—1 & 2 Family	Unlimited	22,000	14,000	48ft. 50ft. 10,000	38ft. 40ft. 6,000	48ft. 50ft. 11,000	48ft. 50ft. 8,000	38ft. 40ft. 7,500	38ft. 40ft. 6,000	2½ft. 35ft. 4,000

Note—For buildings of the use groups A, B, C, D and E with frontage of more than 25 percent of the building perimeter on one or more streets, the tabular area may be increased 2 percent for each 1 percent of such excess. In use groups B, C, D and E, the tabular areas may be increased 100 percent when equipped with automatic sprinkler systems not specifically required by law. The maximum total permissible increased floor area, however shall not exceed 2½ times the tabular value. In use groups B, D, and E, isolated buildings of other than type 4 construction may be of unlimited area outside of the fire limits when not more than one story or 85 ft. in height with fire separations, exit facilities and fire extinguishing equipment. In use groups B, D and E, Types 1, 2 and 3 construction may be increased one story but not more than 20 feet in height, when equipped with automatic sprinkler not specifically required by law. Private garages and airplane hangars within the fire limits shall be limited to one story or 15 ft. in height and 750 sq. ft. area of type 2C or 4A construction and 500 sq. ft. of type 4B construction. Stadia and grand stands of type 3 or type 4 construction shall be limited to 25 ft. in height. Church auditoriums of type 4 construction may be erected to 45 ft. in height and of type 3A construction to 65 ft. in height. Hotel buildings of type 2B or 3B construction shall be limited to three stories in height; of type 2C or 3C construction shall be limited to two stories and of type 4B construction shall be limited to one story. For exceptions to height and area limitations of use group A (high hazard uses) see Art. 4 Basic Code.

constructions where they are reasonably applicable.

The basic code also allows use of the modern techniques that furnish ½-hr. protection in frame construction and help to meet the alarming fire menace in dwellings. It is generally conceded that one-half hour should be allowed for occupants to escape, and structural elements of the building, therefore, should be capable at least of resisting fire for one-half hour from the time of outbreak. Many substandard constructions, prohibited by existing building code restrictions, will satisfy the ½-hr. performance standard and will add immeasurable fire safety to the traditional frame building.

General height and area limitations

The basic code limits the permissible bulk of buildings based on the national fire record reported in the NFPA QUARTERLY. A "use-group factor" was developed from these statistics to reflect the relative number of fires and the life-loss and property-loss per fire in each group. This is shown in the accompanying table.

To establish a uniform degree of fire safety, the permissible bulk of construction should be indirectly proportional to the hazard of the specific use. With a value of unity assigned to the use-group (F2) factor representing the greatest potential fire hazard, other use groups have been assigned their relative values. In developing these factors, all combustible types of construction were penalized for the amount of actual combustible material entering into the design of the structural elements.

The permissible bulk of construction should be directly proportional to the degree of fire resistance offered by the construction. With a value of unity assigned to the unprotected frame (Type 4B) construction, other structural types have been given factors reflecting their relative fire resistance.

The final area-control factor for limiting the permissible bulk of a building of any use group and specified type of construction is determined by the product of the corresponding use and construction factors.

The base area value to be assigned to the most hazardous use and type of construction is a matter of experience and judgment. In the basic code, an area of 1,000 sq.ft. was allotted to the highest hazard use group (F2) and construction type (4B). Resulting comprehensive tabulation of height and area limitations is shown in the table for all uses and all types of construction. Limiting areas are obtained by multiplying the area factor by 1,000, with unlimited areas recommended when the area factor reaches a magnitude of 25 or more.

These allowable areas are permitted in buildings that have a frontage of 25 percent of the perimeter of the building on one public street. The code provides for increased areas when greater building frontages are accessible for fire fighting and when provision is made for special automatic fire-extinguishing equipment, together with other specific exceptions.

The basic code also assigns a fire-load factor to each use group expressed in equivalent hours of required time-temperature performance. In establishing this fire-load factor, due allowance was made for special fire-prevention and fire-protection features required in the basic code for specific use groups.

The solutions proposed in the basic code to establish fire loads and secure a uniform degree of safety admittedly still involve many controversial features, but they offer a rational substitute for the rule-of-thumb and hit-and-miss methods of approach in most existing codes. It is significant that existing regional codes frequently reflect in their provisions the preponderant supply of locally available materials to the disadvantage of competitive materials from other areas.

Controlled materials procedure

Complete structural disasters are rare and account for a relatively small annual loss of life. But they do occur, and troublesome and avoidable structural failures are not infrequent. Use of high working stresses without complete technical supervision of the design and execution leads to excessive deflection and incipient failures that frequently require continual supervision and maintenance replacements.

With the advent of the performance code, and with constant development of new materials and techniques, some such device as "controlled-materials procedure" is necessary for effective administration of building regulations. As proposed in the basic code, its applications are expanded to all materials from present practive in partial utilization of stress-grade and trade-marked lumber, under American Society for Testing Materials specifications, and of controlled concrete mixes and design stresses, under American Concrete Institute regulations.

The basic code makes a special provision in the case of plans for the erection or alteration of a building that are prepared by a licensed professional engineer or registered architect, who supervises preparation of the architectural, structural and mechanical design plans, working drawings and shop details, and who will supervise field erection. The building official, in such cases, may waive examination of both plans and field inspection of the construction.

When applications for unusual designs or magnitude of construction are filed, the building official can refer the plans to the BOF for advice as to safety and compliance with the basic code. Or he may, when necessary, retain a properly qualified licensed engineer or registered architect to examine the application.

The BOCA–BOF has furnished a plan and a goal for all interested in building-code reform. This program, with the united support of the building industry, can bring about a considerable improvement in building conditions. At present, the ABC document is available. The basic code is still in preparation but is expected to be completed early this year. By the end of the year, the program should be in full swing.

U. S. issues regulations For rental housing

The Federal Housing Administration has announced issuance of administrative rules and regulations for the rental housing yield insurance program that was written into the National Housing Act by the recent special session of Congress.

Yield insurance is available to individuals, unincorporated groups, corporations, trusts and other legal entities approved by FHA. The aggregate outstanding insurance liability may not at any one time exceed $1,000,000,000, and a revolving fund of $10,000,000 has been established for payment of claims and expenses.

The purpose of this new type of insurance, according to Franklin D. Richards, FHA commissioner, is to attract equity capital into the production of rental housing for families of moderate income, where no mortgage financing is involved. Under the provisions of Title VII of the National Housing Act, FHA is authorized to insure the minimum annual amortization charge of 2 percent of the established investment, and an annual return of 2¼ percent on the outstanding investment. The term "established investment" includes all approved costs prior to initial occupancy.

Mr. Richards said that field offices of FHA throughout the United States are prepared to discuss applications for yield insurance and to explain details of its operation to investors.

THE "CROOKEDEST TRESTLE in the world" is used to place concrete in spillway and intake structures at Davis Dam.

Admixture Combats Alkali Reaction in Davis Dam Concrete

Editor's Note: Although Davis Dam is an earth-and-rock fill, the extensive concrete work there is of interest from two standpoints: (1) the contractor's equipment and procedure and (2) the use of a siliceous admixture to reduce expansion due to an alkali-aggregate reaction. Part I, Mixing and Placing, is presented herewith. Part II, Siliceous Admixture Selection, will appear in a subsequent issue. The first of these was prepared by a staff editor who has visited the work three times since it started early in 1946. Part II is by two Bureau of Reclamation engineers who participated in the decision to use the siliceous admixture.

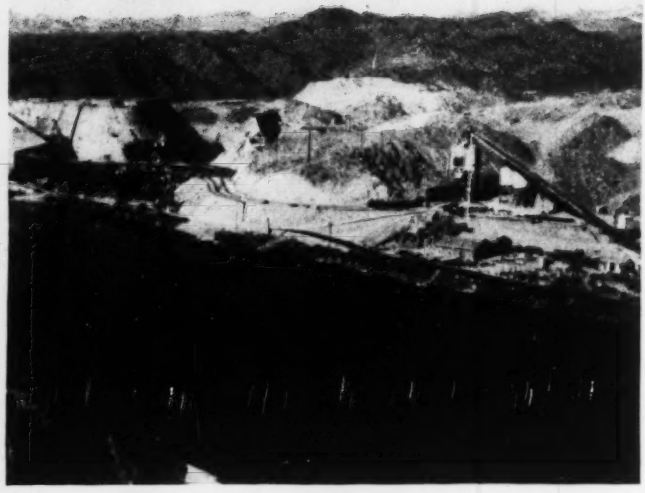
To PREVENT excessive alkali-aggregate reaction in Davis Dam concrete, a siliceous admixture is being used to replace almost 20 percent of the cement. This admixture, a calcined, siliceous shale, is a pozzolanic material that quickly reacts with the alkalis and thus prevents attack on the aggregate with consequent disruptive expansion.

A feature of this concrete work is the mixing and placing procedure—two 40-ton capacity whirler cranes operating on a S-curved trestle are used. As much as 400 lb. of ice is added to each 4-cu.yd.-batch to keep the temperature of the concrete within allowable limits.

Davis Dam (ENR Aug. 22, 1946, vol. p. 230) is a 3,600,000-cu.yd. earth- and rock-fill dam, but 530,000 cu.yd. of concrete is involved in the spillway, powerhouse, intake structure, gravity wall and forebay channel. Aggregate used in the dam is similar to that used in Parker Dam—75 miles downstream on the Colorado River and first major structure where alkali-aggregate reaction was noted.

Concrete-placing progress

Concrete work has been under way at Davis for more than a year. The construction schedule required that the concrete in the forebay channel, spillway and intake structure be safely above the diversion channel water level before the river could be diverted (ENR Aug. 5, 1948, p. 70). Further concrete placing on these structures, as well as the powerhouse, continues



LAYOUT OF TRESTLE, diversion and forebay channel, batch and mixing plant and aggregate conveyor are seen from across the river.

now that diversion has been completed.

During all this time some alteration of quantities has been made in accord with test data on concrete samples. Procedure and mix are now well crystallized.

Mixing and placing

Concrete work here is relatively expensive compared with many other projects requiring about the same cubic yardage, because much of the concrete is poured in specialized sections, varying from a few inches to several feet thick, with considerable reinforcing.

Besides this, much equipment is involved to get the concrete to the specialized sections, and—because the construction schedule necessarily requires the concrete work to be spread over a 3-year period—money invested in the plant is tied up for that period.

One advantage of the miscellaneous variety of the concrete work is that setting forms and reinforcing slows progress so that two 4-cu.yd. mixers are easily able to keep up with the work.

Because mixing and batching equipment was difficult to get when concrete work at Davis Dam was first scheduled to get under way, the contractor, Utah Construction Co., bought the facilities used at Fontana Dam in Tennessee. This mixing plant was secondhand and much repair and reinforcing work had to be done while it was being set up. For example, a layer of hard face-weld some ¼ in. thick was placed on all of the inside surface of the mixers. This required 1,450 lb. of welding rod for each mixer. To fully repair the entire plant and construct it, including the construction of the aggregate conveyor trusses, more than 11,000 lb. of welding rod was used.

Plant operation

The operation of the plant is somewhat as follows: Graded and washed sand and rock are delivered to the top of the batch plant by a 36-in. belt conveyor. The aggregates are screened and deposited into charging bins. This secondary screening separates aggregates broken in handling so the classifications more nearly represent true sizes.

Cement and admixture are held in two 5,000-bbl. cement storage silos at the batch plant and moved by an air pumping system to charging bins, to be charged independently in the mixer.

The materials for a batch of concrete are dropped by gravity from the high charging bins into eight steel batchers suspended on scales. Electric controls automatically regulate amount of each material. The batch is then charged into one of the two mixers and mixed for 2½ min.

Concrete is discharged into buckets loaded on a flatcar. Four full buckets constitute a load and are hauled by a gasoline dinkey over a standard gage track out on a trestle. Whirler cranes mounted on the same trestle place the concrete and move forms, reinforcing steel, etc. The flatcars have capacity for five buckets, and an empty bucket is usually left at the whirlers.

The cranes have 150-ft. booms. They are capable of lifting 40 tons at a distance of 40 ft. from the center of the crane and 9 tons at a 160-ft. distance.

Trestle forms S curve

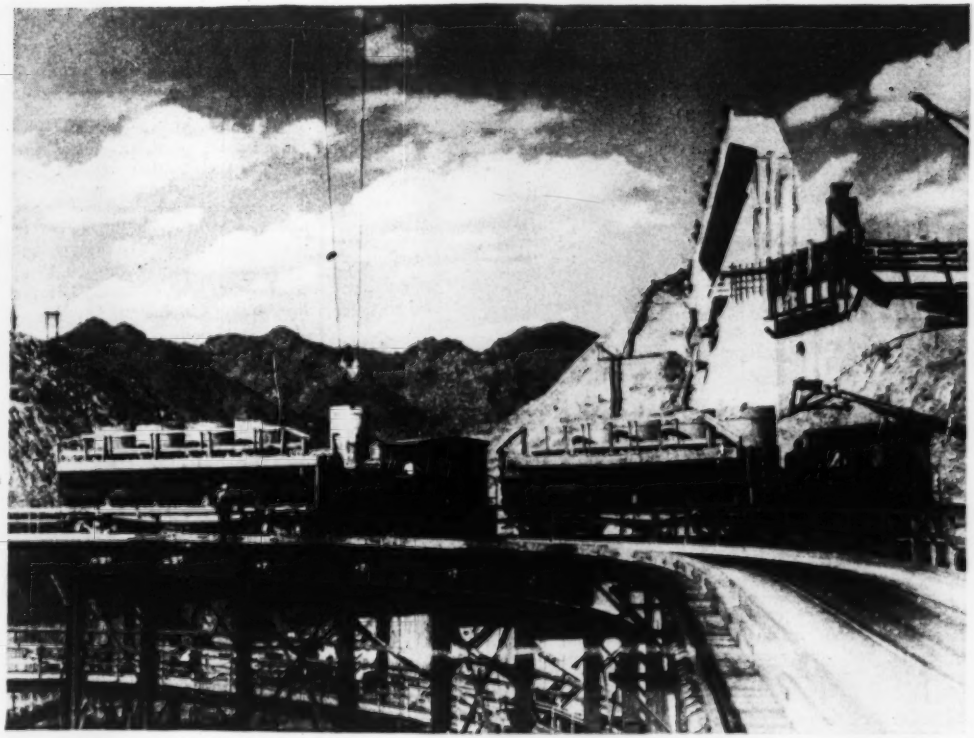
The trestle leading from the mixing plant to the spillway section and thence to the intake section is in the form of an "S" curve. One turn is just before the spillway section is reached and the other between the spillway and intake sections. This forms what the contractors call the "crookedest trestle in the world." Minimum radius of curvature for the inside rail is 120 ft. Gage for the crane tracks is 43 ft.

At a later date, an additional trestle section will be erected to form a "Y" at the spillway-intake structure junction. This Y section was originally thought unnecessary. However, the subsurface conditions encountered provided poorer foundation than had been anticipated and the intake structure and power plant were separated by an angle of 28 deg. (ENR June 12, 1947, vol. p. 948). As originally located, the right end of the structure penetrated into a fault zone. The new location retains a layer of more reliable rock between the foundation and the fault zone, providing greater resistance to shear and sliding. Besides requiring a branching of the trestle, the alteration in alignment caused an increase in the curvature of the trestle.

The intake and spillway structures were built first up to river level so they could restrain the water during diversion. Work will be done on the power plant simultaneously with the fill work for the dam proper.

The cranes have four sets of wheels and are driven by electric motors geared to two of these sets. Originally, motors were mounted on wheels on opposite sides of the trestle, but on the sharp curve, one motor would be seriously overloaded and threaten to burn out. This was overcome by the unorthodox mounting of both motors on sets of wheels on the same track, so that there would not be a speed imposed on the motors different from that for which they were designed.

The greater percentage of the concrete will be placed from the trestle. Part of the work—such as slope paving and the gravity wall—could not be



GASOLINE-DRIVEN ENGINES haul flatcars along the trestle to deliver concrete buckets to whirler cranes for placing.

reached from the trestle, and a mobile crane with a long boom placed this concrete. After this crane lifted the concrete buckets as high as it could from the bottom of the channel, the remainder of the concrete was placed from the top of the bank.

Other features

The gravity wall is essentially a gravity dam, filling a low place in the side of the forebay channel, and contains some 15,000 cu.yd. of concrete. Backfill behind the gravity wall on the left side of the forebay channel consists of a rolled rockfill covered by a dumped rockfill.

The 150-ft. deep forebay channel slopes are paved for a distance of several hundred feet up-channel from the spillway and the intake structure. Further up, the slopes are covered with gunite below diversion-water surface level.

To anchor the slope paving, 1¼-in. square reinforcing bars are grouted in place to a depth of at least 4½ ft. on centers varying from 5 to 7 ft. These anchors are bent in a hook form so they will firmly embed in the 18-in. thick slab.

In all of the Davis Dam concrete work, important exposed surfaces were water cured. A white-pigmented curing compound is used for unexposed surfaces and for those exposed surfaces where appearance is not important.

Ice in the concrete

Because of a requirement that concrete must be at less than 80 deg. F. when placed, ice must be added to the mixing water. With air temperature in the summer exceeding 110 deg. F., the concrete frequently reaches a temperature as high as 170 deg. F. Even though the aggregate is protected from the direct rays of the sun by a shed (ENR Oct. 2, 1947, vol. p. 448), it averages more than 100 deg. F.

To effect proper reduction in temperature, more than one-third of the required weight of mixing water is added in the form of ice. In a typical 4-cu. yd. batch about 900 lb. of water is required. As much as 400 lb. of this water is added as ice. By the time that the 2½-min. mixing period has elapsed, all of the ice is melted and the "concrete cocktail" is down to the required temperature.

To produce this ice and to reduce mixing water temperature, three Vogt automatic tube ice machines were installed at the mix plant. This installation is capable of reducing the temperature of 2,100 gal. of water per hour from 70 to 32 deg. F. It will also produce 60 tons of crushed ice per 24-hour operating period.

The ice is carried on a short conveyor to a bucket elevator that carries it up to the top of the batching floor. A screw conveyor then takes it to the water and ice batchers. This conveyor system is completely enclosed to reduce loss by melting.

At Fontana Dam, where the equipment was previously used, steam coils were used in the aggregate stockpiles to prevent freezing.

Spillway bucket design altered

Among the changes made in design because of poor rock encountered in excavations was a change in the spillway bucket design. The original bucket was so designed that for maximum discharge and ultimate tailwater conditions, the jet would sweep out, creating high velocity flows downstream. A hydraulic jump basin was substituted for a spillway bucket.

A PERFECT RATING, 100, was given this section of Arizona highway in 1948.

Arizona Highway Program Based on Annual Rating

Wm. E. Willey
Engineer, Division of Economics and Statistics
Arizona Highway Department, Phoenix, Ariz.

A PRIMARY AID in the programming of state highway construction in Arizona is the highway sufficiency rating system developed there in recent years. This involves the inspection and classification of the entire highway system to determine the portions that are most in need of repair or reconstruction. The Arizona Highway Commission has closely followed the priorities recommended by this classification in establishing its annual program.

Since the state's highway mileage is limited, two trained men can make all the necessary inspections. Thus, the personal element as represented by the difference between evaluators is minimized. These men classify the roads on three general bases: condition, safety and service.

A cursory examination of the state highway system makes it obvious that many sections of road are unsafe, others are in a precarious structural condition, and others obsolete from the standpoint of service rendered the motoring public. Many roads are inadequate in all three respects. All three criteria should be evaluated in considering which section to improve first. One road may be in poor structural condition, but be perfectly safe. Another may be dangerous but have a surface in good condition. A third may be in good condition and structurally safe but be crooked and limited in permissible average speed.

To take these factors into account and at the same time have each measured element small enough to assure uniform treatment, numerical values are assigned. The various routes are then divided into sections, each about 5 miles long, this being the average length of construction projects in Arizona.

An ideal road is thus assumed to have 100 points, divided into three major categories as follows:

Condition	35
Safety	30
Service	35
Total	100

The 35 points assigned to "Condition" are further broken down to:

Structural adequacy	17
Anticipated remaining life	13
Maintenance economy	5
Condition Total	35

"Structural adequacy" in the above is further broken down to Excellent, Good, Fair and Poor, with a point range assigned for each. Anticipated remaining life is based on experience tables of similar road types, with one point given for each year of expected remaining life up to a total of 13. "Maintenance economy" is rated upon the variance of maintenance expenditures from average.

In the analysis of factors affecting safety, the following factors were assigned appropriate weights:

Roadway width	8
Surface width	7
Sight distance	10
Consistency	5
Safety Total	30

Roadway widths are compared against standard widths for the class of road involved as determined by traffic volume and terrain. In cities, the terms marginal friction, medial friction and intersectional friction are used in place of the terms roadway width, surface width, and sight distance respectively. "Consistency" is the absence of abrupt surprises such as narrow bridge structures, or so-called death curves.

Service is a measure of the dispatch and ease with which a road user can make a trip. The 35 points assigned service are subdivided into 20, for dispatch, and 15, for ease. These are broken down as follows:

Dispatch:	
Alignment	12
Passing opportunity	8
Ease:	
Surface width	5
Sway in cross section	5
Roughness of texture	5
Service Total	35

Each roadway section is compared with standards for traffic and terrain. For example, a road with an alignment sufficient for 50 mph. in mountainous country and carrying less than 1,000 vehicles per day is fully sufficient in this respect (12 points), whereas in the flat country of open desert it would be rated only 9 points.

Adjusted for traffic volume

After each section is rated, a correction is applied to give a greater priority (i.e. lower sufficiency) to exceptionally heavy-travelled roads. The basic rating, thus adjusted, is called the "adjusted sufficiency rating." The adjustment was made in proportion to the amount of deviation from the average traffic volume on the federal-aid system.

For example, a road rated at 60 points, with an average daily volume of traffic of 1,300, is rated at 60 points. If this same road carries only 300 vehicles a day, it rates 70 points. If it carries 5,000 vehicles a day the rating is 50 points.

All of these factors are entered on cards by the evaluators. Punched cards for mechanical sorting can then be made. However, a glance at the original cards will show the condition of any particular road section. Samples of the records kept are shown in accompanying illustrations.

As recent rating work on Arizona highways progressed, it became apparent that certain sections, although adequate in general, are so extremely deficient either in safety or condition that special consideration is required. Accordingly, these particular sections are placed on special lists. These lists

cover critical structural conditions and dangerous sections with low safety ratings. An additional list is prepared showing bridges that are rated lower than the adjacent roadway sections.

After all sections of the various highways are rated, a graph is made showing the relationship between the number of miles in each rating group and the total miles on the system. In the most recent rating, it was determined from such a graph that the slope of the curve became constant at about 60 points. This is designated as the critical rating position. Any section with a rating of 60 points or below is carefully analyzed for improvement while those above 60 were allowed to wait until the following year. By following this logic, it is possible to spend funds for construction where the highest point value gain can be realized for the highway system as a whole.

After use of this method for two years, the adjusted sufficiency rating for the Arizona highway system has increased from 69.5 for 1947 to 73.7 for 1948. This is a good indication of the progress made between two years. Similar additional checks will be made from year to year.

The Arizona system includes 552 sections on the primary system and 190 on the secondary system. The punched cards containing information for each section are sorted and tabulated mechanically in order of ascending adjusted sufficiency rating, without regard to route numbers, geographical location within the state, or political influence.

In establishing the highway program, each section with a low rating is investigated. First it is determined whether plans and surveys have been completed. If not, they are ordered. If such plans have been made, construction work is usually undertaken.

Limitations of system

It is realized in the Arizona department that the sufficiency rating, like any other mathematical checklist, has its limitations. In the final analysis it can only serve as an aid in programming work. For example, the location of new routes and the programming of funds for their construction must be taken care of by special surveys, considering the economy of the state as a whole. Also, in any one year it is impractical—as well as highly undesirable from a policy standpoint—to spend all construction funds on any one route or on any one locality, even though some low-rating sections might be involved. Thus, though the sufficiency rating is used as a starting point, the human element as well as the political element is considered in planning what is believed to be a well-balanced construction program involving all roads on the state system.

The 1948-49 budget is an indication of the success of the Arizona sufficiency rating system. During this period, 84 percent of the mileage planned or constructed was rated at 60 points or less.

This system was developed under the direction of W. C. Lefebvre, state highway engineer.

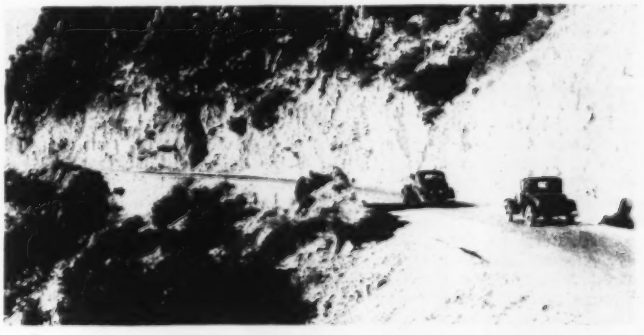
66	1	80.93 To 86.34		80	EF	34	1607	5.41	66	65	MOHAVE
Route Dist.		Route Mile		FAP		Yr. Built	Av. Daily Traffic	Length	Basic Sufficiency	Traffic Adjusted	County

STRUCTURAL ADEQUACY	Standard	Actual	Par	Rating
Observed Condition		Fair	17	14
Estimated Life		14 / 34	13	4
Maintenance Economy			9	5
Consistency				5
STRUCTURAL ADEQUACY				23

SAFETY	Standard	Actual	Par	Rating
Roadway Width (Marginal Friction)	40	28	8	2
Surface Width (Medial Friction)	24	20	7	3
Stop Sight Distance (Intersect. Fricl.)			10	8
Consistency			5	4
SAFETY				17

SERVICE	Standard	Actual	Par	Rating
Alignment (Safe speed)			12	9
Passing Opportunity			9	7
Surface Width			9	1
Sidewalks			10	9
SERVICE				26

NO NEW WORK is planned for this road, which has an adjusted rating of 65.



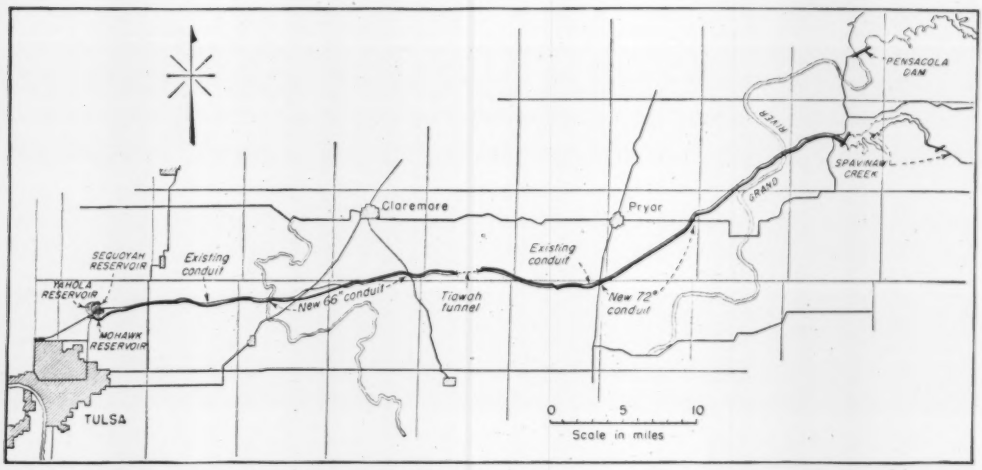
60	3	238.32 To 242.88		16		30	1495	4.56	34	33	GILA
Route Dist.		Route Mile		FAP		Yr. Built	Av. Daily Traffic	Length	Basic Sufficiency	Traffic Adjusted	County

STRUCTURAL ADEQUACY	Standard	Actual	Par	Rating
Observed Condition		Fair	17	10
Estimated Life		M-30	13	2
Maintenance Economy			9	3
Consistency				5
STRUCTURAL ADEQUACY				15

SAFETY	Standard	Actual	Par	Rating
Roadway Width (Marginal Friction)	40	20	8	0
Surface Width (Medial Friction)	24	18	7	1
Stop Sight Distance (Intersect. Fricl.)			10	3
Consistency			5	3
SAFETY				7

SERVICE	Standard	Actual	Par	Rating
Alignment (Safe speed)			12	4
Passing Opportunity			9	1
Surface Width			9	1
Sidewalks			10	6
SERVICE				12

PRIORITY IS HIGH for this narrow highway, which has a rating of only 33 points.



INCREASED WATER SERVICE will be available to Oklahoma's second city, when work now under way is completed.

Timetable Financing for Tulsa Conduit

THE LATEST ADDITION to Tulsa's water supply system—the $15,750,000 Second Spavinaw Project just getting underway—is already distinguished by the novel contracting procedure under which the work for 48½ mi. of new conduit has been let.

Tied to a bond-issuing timetable for financing the job as it progresses, the scheme lowers the city's interest charges and gives it a firm price and completion date on the whole conduit, yet leaves it the option to proceed with only the first section of the line, should future financing fail. The contractor is protected against loss through exercise of this option by a permissible unbalancing of the unit prices bid on the two sections.

At present, Tulsa get its water from Spavinaw Creek, 60 mi. northeast of the city. Built in 1924, the original supply system included an earth and concrete dam and 52½ mi. of 60 and 54-in. reinforced concrete conduit plus 2 mi. of 84-in. tunnel that bring water by gravity to a half-billion gal. storage reservoir at Mohawk, near the city limits. From here, water is pumped 4 mi. through a 30-in. steel force main to a 10-mg. high-service reservoir that feeds the water distribution system for the city.

The original Spavinaw Project was augmented by new storage lakes at Mohawk, a 40-mgd. filtration plant, new force mains from Mohawk to the city, larger pumping facilities and a 2½-mg. standpipe. However, no additions were made that would increase the supply of water from Spavinaw to Mohawk.

Project recommendations

In 1947, studies were made for the Second Spavinaw Project to bring more water to Mohawk for distribution throughout Tulsa. The main recommendations were: (1) Further development of Spavinaw Creek upstream from the present lake by building a new concrete dam 85 ft. high to store 100,000 acre-ft.; and (2) construction of a new 72- and 66-in. conduit with a capacity of 40 mgd., paralleling the existing 25-mgd. conduit whose capacity has been decreased by growths within the line. Another recommendation was raising the non-overflow sections of the present Spavinaw Dam to provide for larger flood discharge and a consequent increase in dam safety.

Facilities for treating the water with chlorine at the existing dam to restore part of the original conduit's capacity and to maintain the capacity of the new line were proposed. A new 15-million gal. high-service reservoir south of the city was also proposed to improve water-distribution service.

Tulsa voted $15,750,000 in waterworks bonds early in 1948 to carry out these recommendations, and W. R. Holway and Associates, Tulsa, were employed as consulting engineers to plan and construct the Second Spavinaw Project.

To save the city a considerable sum in interest charges and to keep the tax rate on a more level basis—rather than permit it to rise suddenly and decline, the bond issue was divided into three parts. Bonds totalling $5,250,000 were issued as of July 1, 1948, $5,750,000 worth will be issued July 1, 1949 and $4,750,000 in July 1950.

Alterations to the present dam and construction of some 20 mi. of new conduit will be paid for from the proceeds of the first sale. The second issue will cover the remaining work on the 54½-mi. conduit, with the exception of a 4-mi. crossing of the Grand River Valley; while the third set of bonds will pay for completion of the entire project.

Separate award for pipe manufacture

Two contracts were awarded in August. One was for $7,275,000 for the manufacture of reinforced concrete pressure pipe for the entire conduit. The second contract amounted to $2,546,000 for constructing all of the line except that at the Grand River and at the existing 2-mi. tunnel that will carry the combined flow of both the old and new conduits. Work under both contracts will be paid for by the bonds already sold and by those to be issued next year. Since all the bonds had been authorized, Tulsa had the legal right to contract for the en-

tire conduit without having the cash in the bank. However, to protect the contractors in bidding, an unusual procedure was followed.

Contracts divided

Under the method devised by the consultants, both contracts were divided into two sections. Section I of each contract involved about 38 percent of the conduit's mileage. Bidders on either of the contracts were required to submit separate firm proposals for each section of that contract, and the award was made on the basis of the low bid total of Section I plus Section II. The proposal and contract documents include the agreement that the successful bidder will proceed with Section I, and will perform Section II if notified by the city before Sept. 1, 1949 that it has elected to go ahead with that section. Thus, the contract is for all the work, but the city need not undertake the second section if it is unable to sell the bonds to be issued in 1949.

Instructions to bidders stated that although the prices quoted on each item of work should have a reasonable relation to probable cost, the contractors would be allowed to bid a different price under Section I than that quoted for the same item in Section II. By bidding higher unit prices on Section I, the contractor could have his moving-on and setting-up expenses and his depreciable plant paid for on the first section in case the second was not undertaken.

Separate bidder's guarantees of five percent of the bid price were required on each section of the contract, with the city retaining the guarantee on Section II until Sept. 1, 1949 or until it has exercised its option. A 50-percent performance bond and a 100-percent statutory bond on Section II need not be posted until 15 days after the contractor has been given notice to proceed with this part of the work.

Examples from the two contracts awarded on the work, as shown in the table on this page, show higher unit prices on Section 1, to cover depreciable plant and preliminary expense. Contract totals are $7,275,014 for supplying pipe, and $2,546,111 for construction, as compared to engineers' estimates of $7,303,352 and $2,870,612 respectively. Bid on each section was below estimate.

Contractors undecided on value

A poll of bidders on the two jobs that were awarded indicated little unanimity of opinion as to the relative merits of this type of letting. Of five firms answering an ENR questionnaire, three felt that the contracting procedure was advantageous to both the city and the contractor, while two believed that it was beneficial to the city only. Queried on the form of the contract, two companies said they would have preferred to bid on Section I only, then bid again at a later date for Section II. Two contractors would rather have had Sections I and II lumped together so the work would have been bid as a whole without the city's second-half option. Only one firm (not a low bidder) was fully satisfied with the actual procedure followed. One reason advanced for preferring separate contracts for Sections I and II was that it would have made it easier for the contractor to meet possible labor and material cost changes. Another company felt that scheduling and purchasing would have been simplified if the whole conduit job had been let under the usual type of contract. The bidder preferring the new method stated that it would have lessened his financing problem, as part of his capital for the whole job would be tied up only during work on Section I.

The city, on the other hand, would not have had a firm price on the entire conduit or know what the total cost would be if bids had been taken on Sections I only. Under the procedure followed, the city has this firm price and only an unforeseen contingency will prevent the completion of the conduit in the same time it would have taken had the contract been let unconditionally on the whole work. In addition, the city's tax problem has been eased.

PARTIAL LIST OF UNIT PRICES SECOND SPAVINAW PROJECT

Item	Section I			Section II		
	Quantity	Eng. Est.	Low Bid	Quantity	Eng. Est.	Low Bid
Contract to Furnish Pipe						
72-in. pipe (35-ft. head)	36,400 lin. ft.	$28.90	$29.51	45,550 lin. ft.	$23.70	$24.47
72-in. pipe (45-ft. head)	11,000 " "	30.50	30.71	12,200 " "	25.30	25.67
66-in. pipe (35-ft. head)	27,800 " "	25.80	25.24	22,600 " "	20.60	20.55
66-in. pipe (45-ft. head)	16,450 " "	27.00	26.24	9,700 " "	21.80	21.55
Contract to Construct Conduit						
Lay & join 72-in. pipe	45,000 lin. ft.	2.00	2.00	80,470 lin. ft.	2.00	1.50
Lay & join 66-in. pipe	58,700 " "	1.75	2.00	70,020 " "	1.75	1.50
Backfill min. 2-ft. over	104,070 " "	.50	1.25	150,910 " "	.40	.75

Virginia Lights up Its Highways

A widespread campaign to make Virginia highways safe for night driving has resulted in the posting of more than 20,000 illuminated traffic signs, painting of 2,000 miles of centerline with reflectorizing material, and marking 300 bridges with warning signs that reflect the headlight beam, the state highway department said recently.

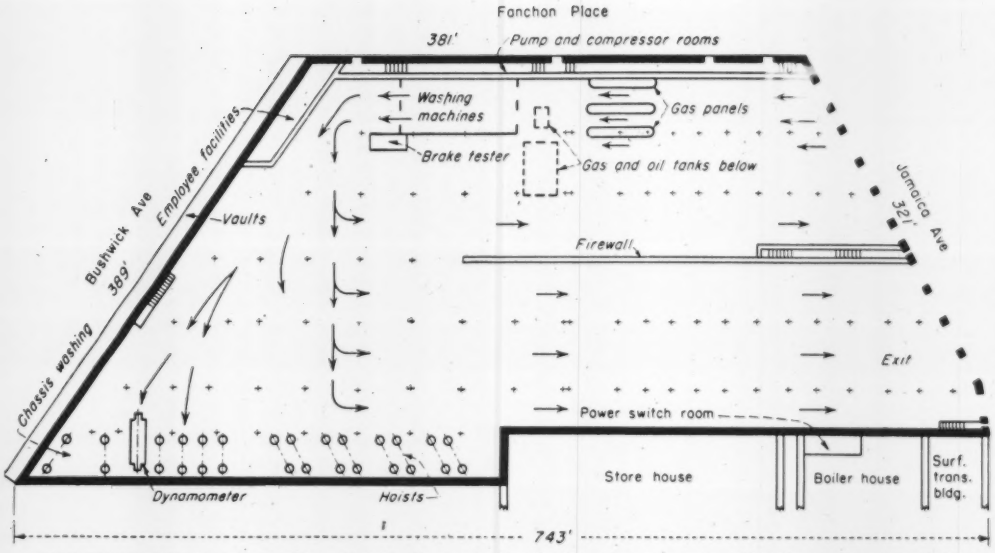
The department pointed out that night highway travel is now, to a large extent, safeguarded by lights or reflector signs, many of which do not attract attention in daylight.

J. L. Thomas, coordinator of traffic lines and signs for the state department, promised that the campaign will be intensified during 1949.

The department assigned top priority to reflectorizing the warning signs—such as "Stop" and "Curve"—along the main routes. Additionally, a number of guide signs and regulatory signs were illuminated on the more important roads. Within two years, Mr. Thomas said, every sign along the primary routes, except those strictly of a daytime nature, will be reflectorized.

Beaded paint, designed to reflect light, was applied on center lines in the mountain, fog, and metropolitan areas. The department purchased five new center-line marking machines during the year to spread this heavy paint. The new equipment ejects paint by means of compressed air, and moves along the road at about seven miles an hour. Older equipment, operated at three miles per hour, was not equipped to handle the beaded paint substance.

On many routes where obsolete bridges are narrower than the highway pavement, 3x6 ft. black and white cross-hatch signs were erected and marked with reflector material. A sharp drop in night bridge accidents has been noted since the signs were installed, Mr. Thomas said. Less dangerous bridges were marked with amber reflector units. About 5,000 of these were installed on railings and head walls.



THE FIRST FLOOR of the East New York Bus Garage in Brooklyn has a storage capacity of 280 buses and servicing facilities.

Bus Garage for High-Speed Servicing

Alfred Brahdy
Division Engineer, Board of Transportation
New York, N. Y.

MOST TRANSIT OPERATORS have found it possible to build their bus garages and repair shops on low-cost land that can be reached with reasonable non-revenue bus mileage. But in Brooklyn, where one-third of New York City's 8,000,000 people are housed in an 81-sq. mi. area, selection of a site for a bus garage and shop requiring 350,000 sq. ft. of floor area presented a serious problem.

Engineers for the city's Board of Transportation found their solution in the reclamation of an old street and elevated railway yard. There the board is now erecting a two-story structure, capable of storing 280 buses, and with a second-story repair shop that will be equipped to overhaul and service a fleet of 1,000 vehicles.

Fortunately, the Brooklyn Rapid Transit Co. years ago—long before it was taken over by the City of New York—had acquired acreage for its elevated-railroad and street-car facilities, in what was then the outskirts of Brooklyn but now is approximately the center of several bus lines. Demolition of a car barn and trolley-car storage yard, closing of one street and relocating of several buildings, cleared five acres of property for erection of three service buildings and the garage.

As indicated in the floor plans above, the garage is a trapezoid, having 743 and 381-ft. bases and 389 and 321-ft. sides. It fronts on Jamaica Ave. and Bushwick Ave., which differ from each other in elevation by 11 to 18 ft. A third side extends along Fanchon Place.

Advantage taken of sloping site

Jamaica Ave., a wide thoroughfare along the low frontage of the plot, will provide ready access to the first floor, where vehicles will be stored. Bushwick Ave., connecting the city's parkway system to several major highways, will be used only by buses entering the second-floor repair shop. Because of the topography of the site, ramps from the street to the shop are of short length.

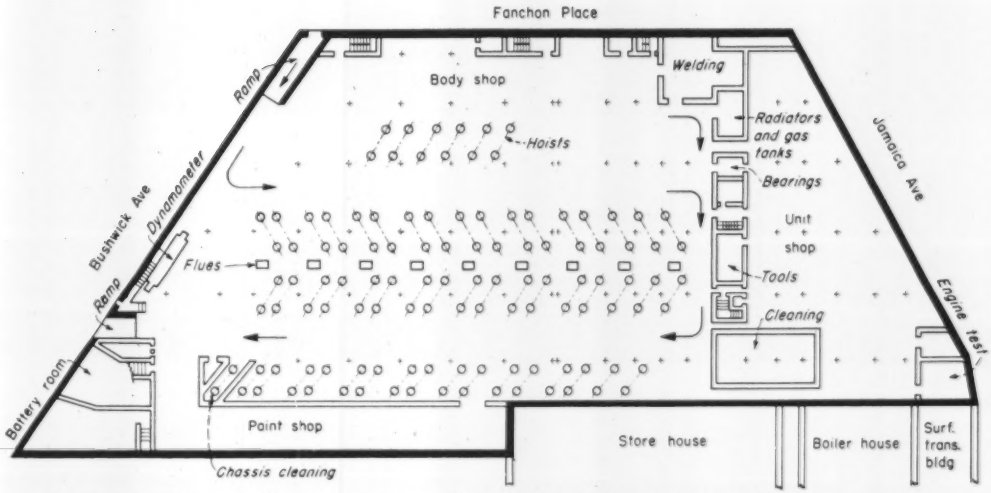
The garage was planned to suit buses now in use, which are 8 ft. wide, 33 ft. long and 9½ ft. high, capable of turning in a circle of 40-ft. radius. The building provides lanes broad enough to accommodate 8-ft. 6-in. wide vehicles. In the first story, operating headroom is 14 ft. under a 2-ft. deep layer of ducts, pipes and lighting fixtures, and in the second story, the overhaul area has 20-ft headroom throughout.

Buses will enter the garage through the three doorways on Jamaica Ave. nearest to Fanchon Pl. They will stop first at the gasoline pumps, which are set far enough inside the building to provide under-cover waiting space for several incoming vehicles. Next, they will go to the automatic washing machine and the brake tester. From there, they will turn into one of the storage lanes, or make an intermediate stop at the dynamometer or at hoists for testing and adjustments.

Vehicles will enter the 2½-acre overhaul area on the second floor via two ramps at the Bushwick Ave frontage. Here there will be 57 twin-post hydraulic hoists. This level will also have shops that occupy a total of 1¼ acres for the repair of bus bodies, chassis, engines and equipment. An equal area is provided on a mezzanine for the central office of the bus division, schoolrooms, medical office, lunch room and other employee facilities.

The mezzanine offices and the second floor shops extending along Jamaica Ave. and Fanchon Pl. have been assigned a maximum of window area. The separately ventilated paint shop is fully inclosed along the rear lot line.

Six tanks, each 6 ft. in diameter, for storing 30,000 gal. of gasoline,



THE SECOND FLOOR, reached by short ramps from the street, is devoted to repair and overhaul shops.

and four tanks for 2,000 gal. of lubricating oil, are located under the garage floor. Sub-sidewalk vaults along Bushwick Ave. will provide storage space.

A three-story and basement warehouse, to which access may be had directly from the second-floor shops, will carry new bus parts and temporarily store junked parts. Next door will be a boiler house. A three-story and basement administration building being built adjacent to these and the garage will house offices and facilities for bus operators and cashiers.

Architectural and structural features

The architectural design calls for brick walls, a granite base and limestone trim at the entrances. Industrial-type metal sash with 3/16-in. clear glass or ¼-in. wire glass is used for windows. Permanent partitions are of brick or gypsum block, steel office-type partitions being used where occupancy is subject to change. Fire risk will be minimized by inclusion of 4,000 sprinklers and a 350-ft. long interior cinder-block wall near the entrance to the garage.

To conserve fuel, it was found economical to place 1½-in. fiberboard insulation on the roof. This is covered with 5-ply membrane waterproofing and slag.

The soil at the site consists of a glacial deposit of sand and clay, permitting footings to be designed to carry 4 tons per sq. ft. for column loads up to 560 tons. Column foundations adjacent to a 65-ft. wide, four-track subway crossing the site had to be carried below normal depth to avoid undue side pressure on the walls of the subway.

A longitudinal spacing of 40 ft. for the columns allows buses to turn in any part of the garage, hence making it unnecessary to travel the full length of the building to a turn-around area at the far end. To permit storage of four lines of buses per bay, a transverse spacing of 45 ft. between column centers is used.

A complete separation in the structural frame, and sliding joints in pipes, vent flues, floors and roofing, at a double line of columns on the central axis of the building, provides for expansion and contraction.

The garage floor has a 7-in. thick reinforced concrete pavement, with contraction and expansion joints. The second floor has a 6-in. reinforced concrete slab supported on steel beams spaced 6 ft. 8 in. on centers, and similar framing supports the 4-in. cinder-concrete roof slab.

Floor finishes vary throughout the building. A 1-in. cement finish was floated in place to form part of the concrete in the garage. For the overhaul shop and corridors, a steel-trowelled finish gives a smooth dust-free surface. The machine and body shops have wood-block floors, classrooms and offices asphalt tile, and toilets quarry tile.

Doors motor-operated

The 11 two-lane wide, wood overhead doors at the Jamaica Ave. entrance provide 12-ft. clearance. Although the doors will be motor operated and have dual push-button control, each will be equipped with a chain for manual operation in case of motor failure. Traffic lights, interlocked with the door mechanism, will show red until the doors are fully opened.

Electric power for the shops will be provided through two switchboards located on opposite sides of the building. To obtain lighting of intensities to suit each location at a relatively low cost, fluorescent fixtures have been specified.

A mechanical ventilation system, furnishing heated air to the garage and overhaul area, will be supplemented by unit heaters at doorways and radiators in the smaller rooms. The motor-operated fans, heating coils, filters, air intakes and exhaust ports of the ventilation system will be housed in a 45x45-ft. fan house set above the general roof. Vent flues to the garage are carried through the second-floor area between the bus lifts. At the garage level, the exhaust ducts are at the ceiling and the air-supply ducts are carried down the building columns to outlets near the floor.

Contract awarded

The general contract for the East New York Bus Garage was awarded in May to Psaty-Atlas of New York City, who entered a low bid of $5,444,352.75. The unit prices bid were published in *ENR* Sept. 30, 1948, p. 83.

William Reid, chairman, with Commissioners Frank X. Sullivan and Sydney H. Bingham comprise the Board of Transportation operating the New York City Transit System. James H. Griffin, chief engineer, is directing the modernization of transit facilities, which includes new buildings for housing and servicing surface vehicles.

FIG. 1. SANTA MONICA DUMPS RUBBISH at the toe of the slope where it is spread upward, compacted and covered by the 26-ton bullclam.

FIG. 2. RIVERSIDE USES THE BULLCLAM to cover and compact refuse previously spread in trench by a bulldozer.

Fill-and-Cover Disposal Curtails Smoke Nuisance

BECAUSE AIR POLLUTION has become so important a consideration in southern California, the cities of Riverside and Santa Monica have discontinued burning refuse in open dumps and substituted fill-and-cover disposal. This method is admittedly more expensive than dump burning, but much cheaper than incineration.

Santa Monica, near the center of the southern California smog area, now disposes of combustible rubbish in one of the first rubbish fills on the West Coast. Riverside, similarly, disposes of mixed refuse (garbage and rubbish) and thus overcomes a local smoke nuisance. Disposal methods in the two cities, although similar in some particulars, in other respects provide an interesting contrast.

Santa Monica experience

In studying smoke abatement at Santa Monica, city officials estimated that with an incinerator, amortized on a 30-year basis, rubbish disposal would cost the city $3.50 per ton as compared to about $1 per ton for fill-and-cover disposal in a large excavation near the geographical center of the city. After the fill is completed (estimated to take 5 to 10 years according to percentage of material salvaged), the filled area may be made into a city park or playground.

Excavated by the Simons Brick Co., during the years when raw material for brick manufacture was taken from this source, the pit is 30 to 40 ft. deep and occupies an area of some 10 acres. Volume of the excavation was about 393,500 cu. yd. Early estimates, made after the fill-and-cover method had been in operation only a short while, indicated that after being "ironed" by the heavy tractor, each cubic yard of compacted fill contains about ½ ton of rubbish.

All Santa Monica's garbage is segregated by residents for a collection separate from other waste material so that garbage can go directly to a hog farm. Garbage collections total about 50 tons daily.

Refuse collected daily

In addition to garbage the city provides separate collections for daily totals of 150 tons of paper, garden trimmings and tin cans. There is daily collection of all cardboard cartons, newspapers and waste paper from offices; this goes to the pit for salvage or disposal by fill and cover. Tin cans, also collected daily in special trucks go to a de-tinning plant which processes about 90 percent of the material collected, sending the other 10 percent to the fill-and-cover operation. Garden trimmings, collected weekly in some parts of the city and semi-monthly elsewhere, go directly to the pit. They constitute the only one of the city's four separate waste collections from which no salvage is obtained.

Before the present method of rubbish disposal was begun, the city paid a contractor $600 per month for disposing of all rubbish (excluding only garbage). Now the contractor operates as a concessionaire for salvaging cardboard, paper, tin and rags (and anything else worth saving).

Method of operating the pit

Pit operation includes delivery from scavengers' trucks to floor of the pit near one of the side slopes. The slopes vary but are in general about 2 to 1. After salvage sorting by the concessionaire, rubbish is moved up the slope by a tractor equipped with a bullclam, a rig purchased by the city expressly for this purpose. The bullclam picks up rubbish from the pit floor and carries or shoves it up the slope. The material is spread over the side slope for a distance of 100 to 125 ft. from the

pit bottom in an area as wide as may be necessitated by the day's deliveries.

The tractor weighs about 26 tons with a full clam. It "irons" deposited rubbish by going over the surface diagonally, up and down and across to obtain maximum compaction. Deposition of cover material is the last operation of the day and does not start until compaction from the "ironing" is considered adequate. Near the end of the day's work, the rubbish that has been spread on the slope is covered 4 to 6 in. deep with material excavated by the bullclam from the bottom of the pit and then spread over the fill.

As this was written, the pit had been used for rubbish disposal only 3 months. In addition to the salvage crew working for the concessionaire, the fill in the pit was being operated by a two-man crew consisting of a tractor operator and a supervisor to instruct incoming trucks where to dump. The expectation was that tractor operation for two 7-hr. shifts would suffice.

Operation of the fill is under the general direction of J. O. Pinkerton, superintendent of refuse disposal. Maurice M. King is Santa Monica's city engineer and director of public works.

Smoke caused trouble at Riverside

Although Riverside is not located in the smog area as is Santa Monica, a local smoke-nuisance problem was presented by an open-fire refuse dump that was long the means of disposal. It was to get rid of this nuisance that more than a year ago Riverside embarked on a fill-and-cover refuse-disposal program. A secondary reason was to eliminate rats that infested the old dump.

For 35 years, Riverside disposed of all rubbish and garbage on an open dump located inside the city limits 3½ miles from its center. About once a week this dump was burned over. Good residential areas were growing toward the dump area and weekly burning became a considerable nuisance. Besides this, burning did not control the ever-increasing rat population.

Incineration was considered, but estimates indicated that costs would be about $1.25 more per ton than for sanitary-fill disposal. Estimating the cost of truck haul at about 11 cents a mile, it was concluded that, if a fill were located within 11.4 miles of the center of haul, sanitary-fill disposal would be cheaper. Since the site used for the open-fire dump was only three miles from the center of haul, it was selected for fill-and-cover disposal. Enough space is available at this site for more than ten years of operation.

Although much the same equipment is used at Riverside as at Santa Monica, the process differs. First the old fire-dump area was leveled off and a trench was dug along its west boundary. Garbage trucks then dumped their loads along side this trench, after which the garbage was pushed into the trench and up on the opposite slope by a small bulldozer.

Then a heavier tractor, equipped with 3 cu. yd. bullclam, was used to pick up some of the old burned material and mix it with fresh dirt. This was spread over the newly placed refuse. In so doing, the bullclam excavated a trench easterly of the existing trench and rubbish, thus simultaneously providing cover and a new excavation. Thus, the function of the bullclam is threefold; it excavates new trench as needed, spreads excavated material as cover over newly placed refuse and effectively compacts new fill as it is being covered.

This procedure, which has now been followed for more than a year, effectively disposes of the daily tonnage of refuse and also of the remains of the old fire dump. Only one man is required to operate the fill.

One complicating factor at Riverside is that the water table is only 6 ft. below ground surface. However, it is possible to place compacted fill to a total depth of 12 ft. by building the finished surface up some 6 ft.

Riverside, with an estimated population of about 50,000, has some 65 to 70 tons of refuse a day to dispose of. At this time, it is estimated that about 3 or 3½ acres a year will be required for the fill. This includes disposal of both the new material and the old residue.

As soon as the Riverside sanitary fill was started, an intensive rat-control campaign was initiated. This has met with apparent success as the fill area is now clear of rats. Health authorities believe that all the rats were killed by poison or trapping and not merely forced into the city proper.

M. H. Irvine is city engineer of Riverside and is in charge of the sanitary-fill work.

Number of Trucks And Tonnage Rose Sharply in 1948

More than double the tonnage hauled over the highways of this country in the prewar years of 1938-40 moved over the same highways last year, according to a statement just issued by H. D. Horton, president of the American Trucking Associations, Inc. Extracts from Mr. Horton's summary of trucking developments follow.

The most outstanding development in the trucking industry during 1948 was the steady, almost spectacular, growth of the industry both in terms of tonnage and vehicles operated. The Public Roads Administration estimated there would be approximately 7,000,000 trucks in use throughout the country by the end of the year, while R. L. Polk & Company, Detroit statisticians, estimated a total of 1,035,000 new trucks would be licensed during the year, making 1948 the first year in automotive history that more than one million new trucks were licensed.

The total of 7,000,000 compares with the 1947 total of 6,500,000 and with a pre-war peak of 4,800,000. These figures reflect heavy production of trucks of all types since post-war reconversion began. In this connection, it is noteworthy that the manufacturers apparently have caught up with demand in nearly all weight categories except the light, panel-type vehicles.

The steady increase in the number of trucks in operation also reflects a growing demand for truck service because of its flexibility, over-all economy and expedited delivery. Further proof lies in the truckloading index compiled by the Research Department of the American Trucking Associations. Although complete figures for the full year will not be available until later in 1949, a record index was assured on the basis of complete figures for the first ten months and partially-complete figures for November.

The index, based on the average monthly tonnage during 1938-1940 as representing 100, reached an all-time peak in September when it was 248. This record was topped by a new one in October, when the index soared to 255—more than two and a half times the tonnage handled during the prewar base period. For the first ten months of 1948, the average index was 229, compared with an average index of 206 in 1947.

Preliminary estimates by the Research Department show that the November index will be below that for October, which consistently is the peak month of every year, but will hold considerably higher than in any previous November. An all-time record for tonnage handled by the industry in any one year is assured for 1948.

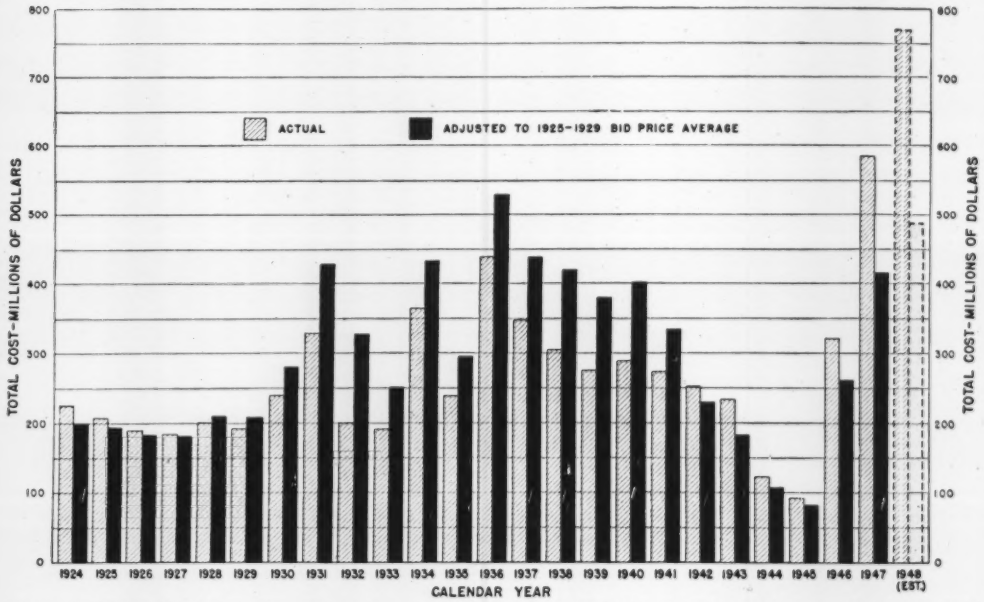


FIG. 1. FEDERAL-AID ROAD WORK reached a record dollar volume in 1948, but the physical volume was less than in 1936.

Highway Work Sets New Record

HIGHWAY CONSTRUCTION in this country reached a record dollar volume in 1948, according to estimates of the Public Roads Administration. The value of road construction by all agencies, state, county and municipal, during the past year is set in the PRA preliminary estimates at $1,734,000,000.

The chart reproduced as Fig. 1 is a comparison of federal-aid work done in 1948 with similar work done in the past 24 years. It was prepared for use in connection with a report on highway progress to the Highway Research Board meeting in December made by R. W. Kruser of the PRA staff. From this chart it will be seen that the 1948 expenditures were far in excess of any prewar outlays on the federal-aid system. However, if these figures are adjusted to account for the lesser amount of highway that can be built for each dollar expended today in comparison to prewar expenditures, due to higher construction costs, it will be seen that the 1948 physical volume is less than that of 1936.

Rate of output rises

The rates at which federal-aid highway work was programed, approval and complete is shown in Fig. 2. Programing of work by the state highway departments in the postwar period followed closely the apportionment of funds to the states by the PRA under the Postwar Highway Act of 1944, which authorized $500,000,000 of federal aid in each of three fiscal years after the act went into effect (1946-47-48). This was due to the advance planning done during war years in anticipation of the need for a greatly expanded program after the war.

By the end of 1948 about 95 percent of the total work authorized by the 1944 act had been programed. When the additional work authorized by the Highway Act of 1948 is included, the programed work at the end of 1948 amounts to 73 percent of the total made possible by the two acts.

Completion lags

But the highway work completed at the end of 1948 amounts to only about 30 percent of the authorized total. This was due to the slow start in 1946 resulting from many causes, chiefly inability to get material and equipment and to the sharp rise in construction costs that very materially retarded the letting of contracts for road work. The slow rate continued until the summer of 1947. Since then the rate of contracts awarded and of work completed has come close to that required to absorb the federal funds authorized in the 1944 act, with some improvement shown in 1948.

TABLE I—STATUS OF POSTWAR FEDERAL-AID PRIMARY, SECONDARY AND URBAN FUNDS (As of Dec. 1, 1948.)

Step	Cumulative Percent of 1944 Act Funds			
	Primary	Secondary	Urban	Combined
Programed	98	93	83	93
Plans approved	80	72	58	72
Projects placed under contract	74	67	51	66
Work done	58	54	27	49
Projects completed	43	42	14	35

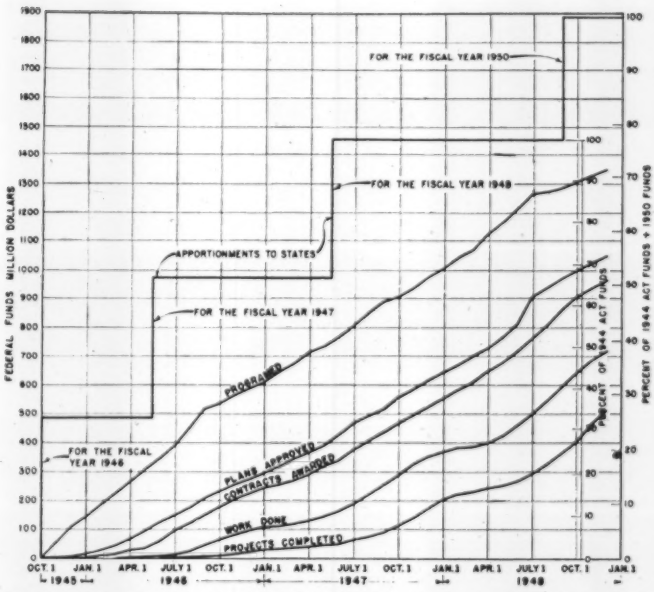


FIG. 2. PROGRAMING OF HIGHWAY WORK under the Postwar Highway Act of 1944 has continued at a high level since 1945, but it was not until 1948 that the work actually done attained a satisfactory rate.

TABLE II—TYPE OF IMPROVEMENTS APPROVED FOR CONSTRUCTION FINANCED FROM POSTWAR FEDERAL-AID HIGHWAY FUNDS

(As of Dec. 1, 1948)

Type	Miles			
	Primary	Secondary	Urban	Combined
Graded and drained earth	1,993	2,596	82	4,671
Soil surfaced	337	346	—	683
Gravel or stone	2,484	14,689	10	17,183
Bituminous surface treated	2,965	10,518	27	13,510
Mixed bituminous	4,087	4,790	27	8,904
Bituminous penetration	483	767	15	1,265
Bituminous concrete and asphalt	1,634	481	112	2,227
Portland cement concrete	2,889	276	282	3,447
Brick and combination	116	5	18	139
Bridges	112	83	30	225
Total	17,100	34,551	603	52,254

TABLE III—BRIDGES FINANCED FROM POSTWAR FEDERAL-AID HIGHWAY FUNDS.

(Approved Dec. 1, 1948)

Type	Number
Stream crossings	6,980
Railway-Highway separations	239
Highway-Highway separations	363
Combinations	102
Total	7,684

This latter increase will help to absorb the large backlog of federal aid that had accumulated at the end of 1948, roughly about $900,000,000 not covered by contracts.

Federal-aid highway work done in 1948, including federal aid and matching funds supplied by states and cities, is estimated by the PRA at $770,000,000, as against $586,000,000 in 1947. When the lag in starting the postwar program is considered, these totals should have exceeded one billion dollars because the federal aid provided by the 1944 act, when matched on a 50-50 basis by states and local agencies, was intended to step the annual work on the federal-aid systems up to one billion dollars during each of the first three years after the war.

Because the states were unable to take up the aid provided under the 1944 act at the rate anticipated when the act was passed, Congress has extended the time in which these funds can be obtained by the states. Also, in 1948, Congress passed a new act authorizing the appropriation of $450,000,000 for federal aid in each of the fiscal years 1950 and 1951, thus adding $1.8 billion to the potential program under the two acts, bringing the total to $4.8 billion.

At the end of 1948 the amount of work accomplished under the combined programs represented an expenditure of about $2 billion dollars.

Looking ahead

Highway contracts awarded by the states in the 12 months of 1948 are estimated by the PRA to total $1,165,000,000. (This figure should not be confused with the figure given earlier for work actually put in place.) Between $375 and $380 million of this total of 1948 contracts is federal aid.

Federal funds from the $450 million authorized by the 1948 act were apportioned to the states on Sept. 1, for the fiscal year beginning July 1, 1949, and a similar allocation to the states must be made by Jan. 1, 1950, for the fiscal year beginning July 1, 1950.

Last week, President Truman, in his budget message, recommended to Congress that $423.5 million be appropriated for the coming fiscal year and that the PRA be authorized to make commitments for an additional $470 million. If this recommendation is approved, federal aid in those amounts for the fiscal years 1950 and 1951 is assured.

In a year-end statement, Thomas H. MacDonald, Commissioner of Public Roads, said that practically all the big jobs put under contract in 1948 were on the new National Interstate Highway system. About 1,490 miles of that system have been brought up to modern standards during the past three years at a total cost of $161 million. On Dec. 1, improvement of an additional 655 miles was under way, at a cost of about $207 million. About 40,000 miles of highway are included in the system.

The need for extensive improvement of the nation's highways, Commissioner MacDonald pointed out, is accentuated by the fact that highway usage has increased steadily since the war. The estimated total of motor vehicle registrations during the past year was expected to exceed 41,000,000, topping all previous records. Total volume of travel during the year was estimated at 395 billion miles, as compared with a total of 370 billion miles in 1947.

The accompanying diagrams and tables were prepared by the Public Roads Administration.

READER COMMENT

Book Review Correction

Sirs: In ENGINEERING NEWS-RECORD June 10, 1948, Hal W. Hunt published a review of the book "Soil Mechanics in Engineering Practice," of which the undersigned are the authors. The last paragraph of this review contains the following:

"The authors unqualifiedly recommend load tests on all soils, whether for spread footings or piles, as an economy measure."

It would have been more accurate if the reviewer had stated that the authors have made special efforts to **discourage** the performance of loading tests for determining the design load on spread footings. According to the book, load tests should be made under exceptional conditions only. Summarizing the results of their detailed discussion of this subject, they wrote on p. 438 the following:

"On large jobs the load test procedure **may** be used. However, it is expensive and cumbersome, and, if it is not expertly planned and executed, the results may be very misleading."

This sentence refers to footings on sands. In connection with footings on clay they state:

"In **doubtful** cases the load test method should be used", but these doubtful cases are exceptions. As the normal procedure the authors recommend in the preceding text the unconfined compression test. "The allowable soil pressure on stiff, fissured clays can be determined only by this method." This is an unqualified recommendation. However, footings on stiff fissured clay are so rare that few engineers will have an opportunity to take advantage of this recommendation.

KARL TERZAGHI
R. B. Peck

Unrealistic Wind Loads

Sir: Existing standard highway bridge specifications provide for variations in traffic volume and intensities with various loadings: H10, H15, H20-S16, etc. For wind however there is only one loading: 30 lbs. per sq. ft. on 1½ times the area of the structure seen in elevation including the floor system and railings, plus a lateral force of 200 lbs. per lin. ft. on live load. This is undoubtedly the correct loading where the structure is in an exposed position and where such loads occur. For a bridge in a sheltered position and not subject to strong wind pressures, there seems to be little point in applying such wind loads. It is suggested therefore that a variation in wind loads be provided, say 0.25W, 0.75W, 1.25W, etc., where W equals the present wind loading.

Recently the writer designed a small country bridge whose deck was practically level with the valley floor in which it was located, the river having cut itself down some 20 ft. lower. The only strong winds that occur blow lengthwise of the bridge; a high hill blankets all wind from the west; a similar high hill is not much more than half a mile to the east.

But it was required by the approving authorities that its design comply with the standard specifications and that was that. Therefore it had to be designed for two H-15 lanes totaling 960 lbs. per ft. of vertical load and for a nonexistent horizontal load of 570 lbs. per ft., i.e. 60 percent of the vertical!

It is therefore suggested that provision be made in the standard specifications for variable exposures and variable wind loadings, that rational requirements be substituted for standard stupidities, particularly when it is reported that the high cost of bridges is causing grave concern in Washington, D. C. these days.

HOMER HADLEY
Consulting Engineer
Seattle, Wash.

Suspension Bridge Stability

Sir: Through the courtesy of Prof. Aksel Andersen of the Technical University of Norway, I have secured information on the aerodynamic behavior of suspension bridges in that country.

The problem is of considerable interest in Norway where they have a number of light suspension bridges with very shallow stiffening girders. In fact the stiffening girders are merely standard rolled I-beams. Serious difficulties in the form of aerodynamic oscillations were encountered on only one of these bridges, the Fyksesund Bridge, completed 1937, with a main span of 755 ft. The stiffening girders are standard rolled beams 17.7 in. deep. The depth: span ratio has the exceedingly low value of 1/511, (compared with 1/350 for the original Tacoma Narrows Bridge) accounting for the extreme flexibility. The width of the bridge c. to c. of stiffening girders is 20.7 ft., yielding a normal **width: span ratio of 1/36.5 (compared with 1/72 for the Tacoma span).**

The depth ratio, not the width ratio, determines sensitiveness to aerodynamic amplification. Doubling the width ratio for the Fyksesund Bridge did not exempt it from critical aerodynamic oscillations. The aerodynamic characteristics (as distinguished from the elastic characteristics) are determined by the depth-width ratio (*d*/*b*) of the section. For the Fyksesund Bridge, this ratio was 0.072, corresponding to practically zero torsional instability, and limited (non-catastrophic) vertical instability. Wind created severe vertical oscillations of the span, but caused no serious damage.

A model of the bridge was tested at the Technical University of Norway, duplicating the observed behavior of the span. The bridge has now been stiffened by inclined stays below the roadway system. Where clearances or local conditions do not permit the use of such underfloor stays, the same results are obtainable by corresponding stays running to the cables above the roadway.

D. B. STEINMAN
Consulting Engineer
New York, N. Y.

Sigvald Johannesson

Sir: I appreciated greatly your editorial about Sigvald Johannesson (ENR Nov. 25, p. 37). There ought to be more notices of that kind. He worked for some years under my direction and I know how good he was and how good he has been in the New Jersey State Department of Highways. Known to but few, a faithful, competent and very valuable worker.

The Danes and English have added lustre to American Engineering.

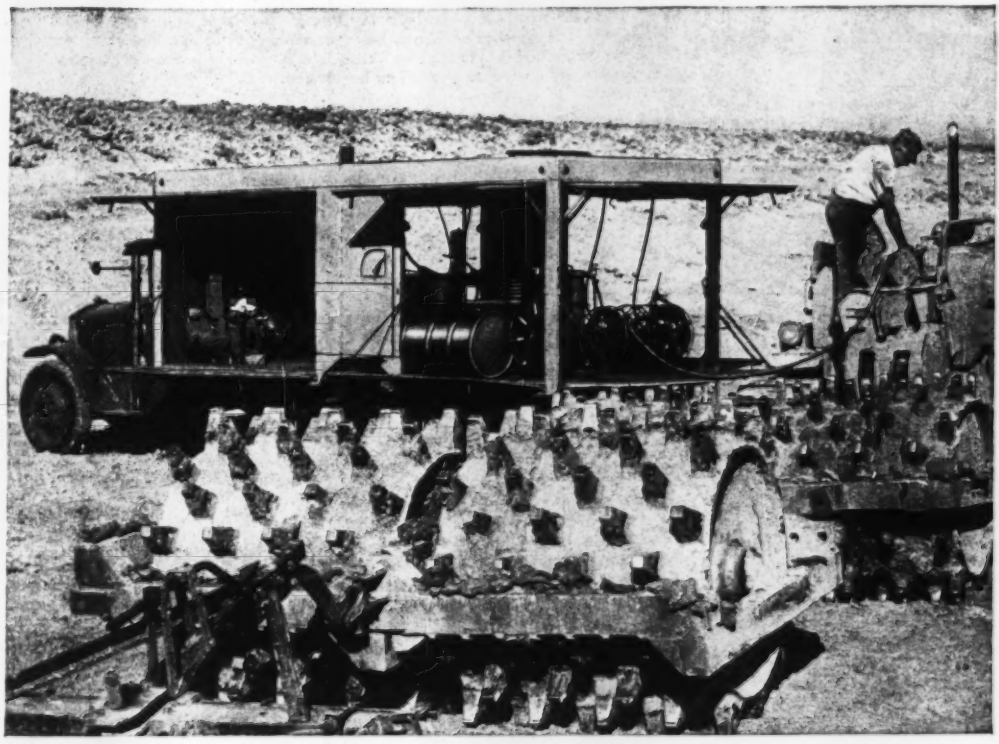
FRED LAVIS
Consulting Engineer,
New York, N. Y.

Correction on Code Revision

Sir: Reference is made to an article in ENR Dec. 2, p. 7, by F. S. Merritt, stating that Minneapolis, Minn., is one of the large cities getting a new building code this year. This information is incorrect, although the author may have confused the building code on commercial and industrial work with the housing code, which is in the Minneapolis city charter, and regarding which a special charter amendment will be voted upon next spring.

R. J. HENDERSHOTT
Manager
Associated General Contractors of Minnesota, Minneapolis 2, Minn.

Slash Costly "Time Out" For Lubrication Up To ⅓ . . .



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UNIT PRICES BID BY CONTRACTORS

Unit price reports, listed below, will be mailed to readers of Engineering News-Record on request at no charge. Address Manager, Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y. Identify by name of project as used herewith, and be sure to give full mailing address.

Neversink Dam, Tunnel and Control Works, N. Y.

Unit price tabulations are available for three lowest bidders on the Neversink Dam and Neversink Tunnel and Control Works. The low and successful bid on the dam was $24,807,980; on the tunnel and control works, $15,641,740.

The Neversink Tunnel and Control Works comprises the intake channel, the intake chamber and superstructure, the release water tunnel and the outlet works. Prices and quantities are reported for 69 items covering excavation of shaft and tunnel in earth and rock, structural steel support and timbering, pumping, drainage channels, steel pipe, concrete masonry, steel sheet pilings and interlinings in intake chamber, aluminum gratings, ladders and doors, painting and chlorination. Contract was awarded on Dec. 8, 1948 to Frazier-Davis Construction Co., 1319 Macklind Ave., St. Louis, Mo.

The Neversink Dam will be approximately 2,800 ft. long and 200 ft. high and will be constructed of earth compacted by rolling. Unit prices and quantities are reported on 40 items covering earth and rock excavation, rolled and rock embankment, portland cement, concrete masonry and pavement, lumber, stone and gravel, reinforcing and structural steel, vitrified pipes, and cast iron and steel pipes.

Conditions for the jobs and minimum wage rates are summarized. Contract was awarded in May, 1948 to S. A. Healy Co., White Plains, N. Y. by the Board of Water Supply. R. W. Armstrong is chief engineer.

Beaver Creek Bridge and Approaches, Monticello, Ky.

Unit prices for construction and grading of 0.388 miles of the Monticello-Albany Road bridge and approaches at Beaver Creek with two 56 ft. reinforced concrete deck girder spans and three 105 ft. 10 in. deck truss spans. The low and successful bid was $221,580.25. Unit prices and quantities are reported for 23 items covering clearing and grubbing, roadway excavation, structural excavation—common, unclassified, solid rock, removing and relaying pipe, reinforcing and structural steel, wrought iron rungs and pipe, entrance pipe and culvert pipe. Contract was awarded on December 8, 1948 to Wellner Contracting Co., Winchester, Ky. by the State Highway Department. Julius Needham is resident engineer, H. H. Sandusky, district engineer.

Residence Streets Improvements, Bethany, Okla.

Unit prices for the grading, draining and paving of twenty residential blocks in Bethany, Oklahoma. Low and successful bid was $108,240. Nineteen items are listed in the bid tabulation covering concrete paving, curb and walk, sand cushion, unclassified excavation, 15" to 24" storm sewers, water lines, valve and meter boxes reset, hydrants and manholes reset, and sidewalk and trees removed. Contract was awarded on September 21, 1948 to Boecking Construction Co., Bethany, Oklahoma by the city of Bethany. V. G. Thompson is city engineer.

Water Tunnel, Baltimore, Md.

Bid tabulations are available for the construction of 52,200 lin. ft. of water tunnel from Baltimore to the Patapsco River. Low and successful bid was $9,717,777.77. Eleven items are listed in the bid tabulation covering shaft and tunnel excavation, furnishing and placing of monolithic concrete lining, furnishing and construction of shafts and pressure grouting. Contract was awarded on July 28, 1948 to Samuel R. Rosoff Ltd. by the city of Baltimore, Maryland. Leon Small is the water engineer; Abel Wolman, consulting engineer.

CORRECTION: In totals of bids listed in unit prices published in the December 23, 1848 issue of ENGINEERING NEWS-RECORD for Highway and Underpass, Roseville, California: Guy F. Atkinson Co., So. San Francisco, Calif. (contract), $1,327,404; Granite Const. Co., Watsonville, Calif., $1,488,418; Bates & Rogers Const. Corp., San Francisco, Calif., $1,519,224; George Pollock Co., Sacramento, Calif., $1,532,342; United Concrete Pipe Corp. & John C. Grist & Ralph A. Bell, Baldwin Park, Calif., $1,539,437; Frederickson Bros., Emeryville, Calif., $1,584,051; Fredrickson & Watson Const. Co. & M. & K. Corp., Oakland, Calif., $1,584,748; Lord & Bishop & A. Teichert & Son, Sacramento, Calif., $1,692,966.

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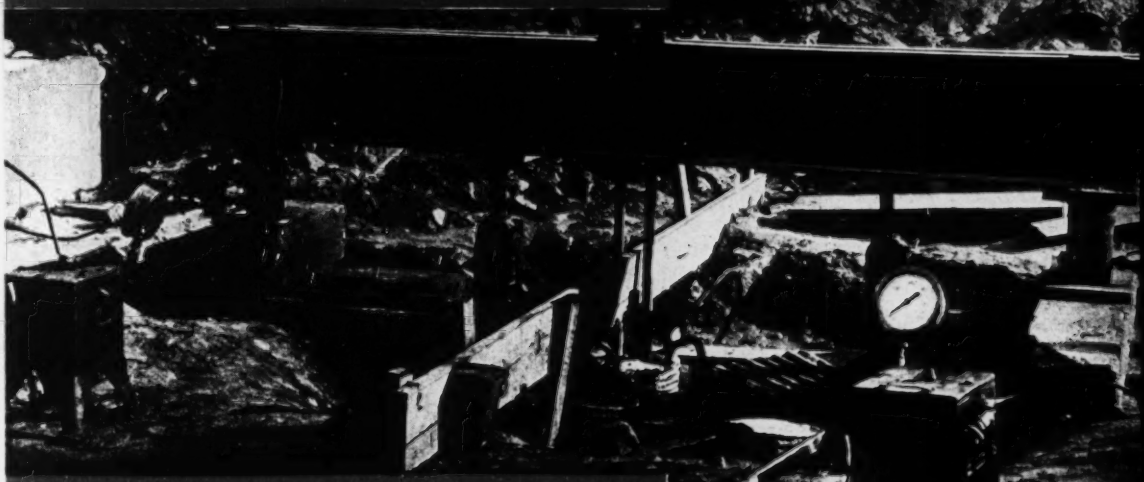

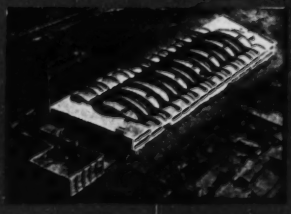

The Motor Repair Shop for the New York City Fire Department in Queens is supported by 651 Raymond Step-Taper Concrete Piles up to 36 feet in length. Some are vertical piles and some are battered and the design load per pile is 30 tons in direct bearing. In addition to the direct bearing load requirement, certain retaining walls in the construction of the building required some piles to be capable of withstanding an uplift force of 30 tons. In accordance with specifications prepared by the City, the Raymond Company satisfactorily demonstrated the uplift resistance of these piles by means of extensive tests.

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General Contractor: Corbetta Construction Co., New York.
Consulting Engineers: Roberts & Schaefer Co., Chicago.

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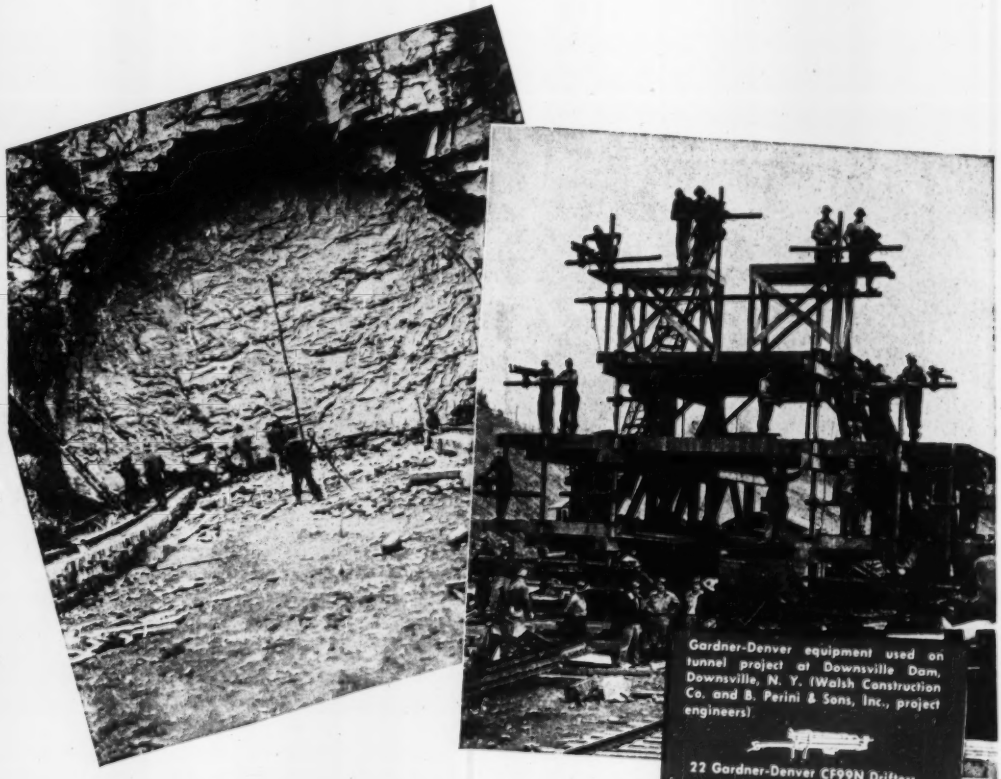


Gardner-Denver equipment used on tunnel project at Downsville Dam, Downsville, N. Y. (Walsh Construction Co. and B. Perini & Sons, Inc., project engineers)

22 Gardner-Denver CF99N Drifters

10 Gardner-Denver S55N Sinkers

8 Gardner-Denver URM & UM899 Wagon Drills

10 Gardner-Denver VP4 Sump Pumps

10 Gardner-Denver B87 Breakers

7 WBK-500 Portables

2 DF-1 Oil Forges

2 D56 Sharpeners

2 HB Air Hoists

2 #94 Stopers

A river goes to town . . .

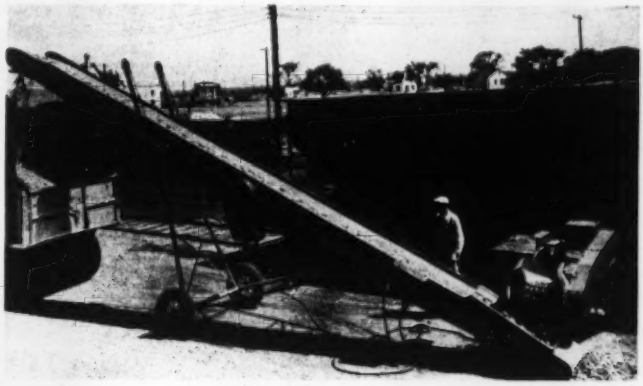
and Gardner-Denver leads the way

Bringing water from the East Branch of the Delaware River to New York is a big project—one that calls for linking three impounding reservoirs with the Delaware Aqueduct. To divert the flow of the East Branch of the Delaware River during the time required to complete the reservoir at Downsville, N. Y., a diversion tunnel 2200 feet long—the largest rock tunnel since Hoover Dam—is being drilled through hard bluestone. On the job is the world's largest "jumbo" . . . and on the jumbo are 20 Gardner-Denver CF99N Automatic Feed Drifters.

Naturally, Gardner-Denver equipment is much in evidence on this $13,700,510 project. For wherever construction work must go forward without delay, the past performance of dependable Gardner-Denver equipment tells why it so often leads the way on America's biggest tunnel jobs. For complete information, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER Since 1859

NEW PRODUCTS



Railroad Car Unloader

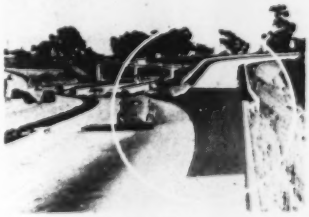
Designed for unloading materials from hopper-bottom cars, equipment is belt-driven through a standard Michigan cone-drive speed reducer. Used with 5-hp. gasoline engine, the cone-drive furnishes a 10 to 1 reduction for the conveyor. With this drive it is possible to start the conveyor under a full load of material.—BARBER-GREENE CO., AURORA, ILL.

Taking Oil Out of Water

Spurred by oil fires on the surface of waters around wartime naval installations, a new product has been developed to remove oil "slicks" from water surfaces near docks, pier or other installations. Known as "Carbosand," the product was manufactured until July of this year exclusively for the United States Government, but is now available to port authorities and commercial interests. The product is described as "a finely divided sand which has been passed through a carbonization process to obtain a carbon coating." It removes oil completely from the surface of the water or from waterfront structures by sinking it permanently.—THE CARBOSAND CORPORATION, 915 EYE ST. NW, WASHINGTON 1, D. C.

Wire Rope Cutter

Portable, self-contained, all-steel Hydrashear cuts wire rope up to 1¼-in. diam. without deformation. Device weighing 70 lb. is manually operated by aplpication of hydraulic pressure and does not have to be anchored when in use. Dimensions are 16 in. long, 6 in. wide and 8¼ in. high. Can be used in any position, vertical or horizontal. Hydraulic pump handle can be locked in a position to serve as a convenient carrying handle. Cutting blade is easily removed for resharpening when necessary.—PELL CABLE CUTTER CO., 55 NEW MONTGOMERY ST., SAN FRANCISCO, CALIF.



Road Marking Stain

To help reduce traffic accidents, the California highway department has approved the application of concrete coloring to sections of the new Cabrillo Freeway entering San Diego. As shown in the illustration, the coloring is applied to highway leadoffs to make them more easily visible in time. The coloring material is Kemiko concrete stain which tests prove offers extended visibility, less glare, and long durability. It is not a surface paint but a chemical solution which penetrates the pores and becomes a permanent part of the concrete.—ROHLOFF & CO., 918 NORTH WESTERN AVE., LOS ANGELES 27, CALIF.

Circular Slide Rule

Of durable laminated plastic for use by engineers, draftsmen, machinists and others will perform the following computations: Multiplication, division, finding squares or square roots, cubes or cube roots, reciprocals and proportions. Printed on a 4¼ in. disk and small enough to be carried easily in the pocket, this rule is said to give only slightly less accuracy than rules costing ten to twenty times as much. Instructions are intended to be understood easily by anyone having a slight knowledge of mathematics.—ALLEGHENY PLASTICS, INC., 329 CHESTNUT RD., SEWICKLEY, PA.

Anti-Freeze

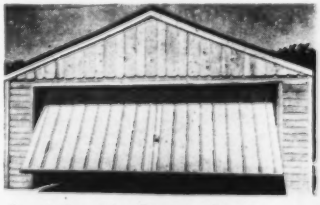
Freezex is a blend of super-refined alcohols to meet requirements of modern automotive cooling systems. Chemical additives prevent rust and corrosion of metals in cooling system and damage to rubber hose. Has high boiling point.—SPECO, INC., 7308 ASSOCIATE AVE., CLEVELAND, OHIO.

Special Lubricating Grease

For truck wheels, track idlers and support rollers of Allis-Chalmers H-D Series tractors. This grease is marketed under the trade name of Penn Drake A.C. track roller grease. Clings tenaciously and lubricates constantly without separation despite exposure to weather, moisture and other extreme service conditions. With base of solvent-treated high viscosity index oil, this grease also contains an anti-oxidant.—PENNSYLVANIA REFINING CO., 2686 LISBON ROAD, CLEVELAND 4, OHIO.

Mobile Scoop

Wagnermobile Scoop, Model C, is a refinement of previous models of the Scoopmobile involving the addition of planetary drive gears to each of the drive wheels. Improvements include wide chassis, large cab, safety glass, short turning radius and simplified hoist control involving a 600-lb. counterweight. Unit is equipped with 10x20 12-ply single tires.—MIXERMOBILE MANUFACTURERS, PORTLAND 16, ORE.



Steel Double Garage Door

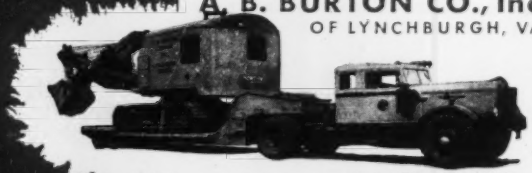
Overhead receding (track) type door for 16x7-ft. openings is of sheet steel that has been hot galvanized and annealed for rust protection. Provides base for paint without need for special priming coat.—STRAND BUILDING PRODUCTS CO., (DIVISION OF DETROIT STEEL PRODUCTS CO.), 1710 BUHL BUILDING, DETROIT 26, MICH.

ECK MILLER OF OWENSBORO, KENTUCKY

DOES IT WITH A ROGERS

using a Rogers Model D-3S-D and a Pole Type Trailer loaded with 80,000 lbs. of steel tank 67 feet in length. The conventional trailer mounts a fifth-wheel type of bolster which supports the front of the load and tows the pole trailer which carries the rear of the load.

A. B. BURTON CO., Inc. OF LYNCHBURGH, VA.



DOES IT WITH A ROGERS

Moving this heavy Northwest power shovel from job to job presents no problem to the A. B. Burton Co. when they have their D-50-D Rogers semi-trailer to rely upon.

DUIE PYLE OF COATSVILLE, PA.

DOES IT WITH A ROGERS

Another 40 tons of tank 70 feet in length is rapidly transported the 70 mile distance from Lancaster, Pa., to Telford, Pa., with a Rogers popular D-3S-D semi-trailer and a PT-15 pole trailer taking the job "in stride".

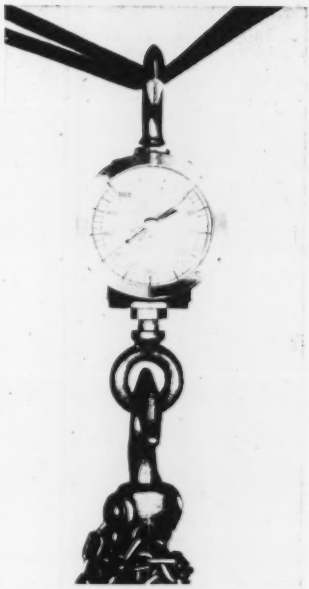
and YOU CAN DO IT WITH A ROGERS trailer, whether the jobs involved require the hauling of light, medium or heavy equipment. Why not learn in detail just what Rogers has to offer. Write TODAY for your copy of the NEW CATALOG.

ROGERS BROS. CORP.

DESIGNERS and BUILDERS OF HEAVY DUTY TRAILERS SINCE 1915

EXPERIENCE builds 'em PERFORMANCE sells 'em

135 ORCHARD ST. ALBION, PENNA.



Crane and Hoist Scale

A new basic method of weighing that includes no springs or levers but involves the static pressure principle is announced. It is first applied to a scale for cranes and chain hoists . . two, five and ten-ton models standard and will be identified as "Hydroscale." Permanently sealed, without moving parts, unaffected by temperature, independently laboratory tested, it is accurate within one half of one percent. It automatically scales as the load is lifted which makes accurate weighing easy where before it has been thought impracticable. — HYDROWAY SCALES, INC., 7632 FENKELL, DETROIT 21, MICH.

Screw Anchor and Drill Kit

To simplify screw anchoring problems, Sand-Scott plastic expanding screw anchors are now available in an assortment kit along with three carbide-tipped masonry drills. New combination kit offers flexibility on all anchoring jobs since the anchors are universal for mounting screws into all materials. Holub drills are designed for hard materials such as concrete, tile, brick and marble—they can be used with electric or breast drills. Kit includes 325 screw anchors and three masonry drills. Anchors are in sizes and lengths for wood screws No. 5 through No. 20 and ¼ and ⅜-in. lag screws.—HOLUB INDUSTRIES, INC., SYCAMORE, ILL.

Our Engineering Department will gladly help you select the right construction of Preformed "HERCULES" (Red-Strand) Wire Rope for your particular equipment.

. . . As a measure of value, nothing can take the place of PERFORMANCE . . . By the use of this accurate yardstick — year after year and under extremely severe working conditions of all kinds — Preformed "HERCULES" (Red Strand) has become recognized as "the Dependable Wire Rope for Any Tough Job". For over 60 years the "Red-Strand" has been a reliable guide to safe and economical wire rope service.

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WHEN THE WINTER BLITZ STRUCK NEW YORK

December 26, 1947 . . . and again January 2, 1948

FWDs were the spearhead of the snow-clearing front

No Christmas present was the record-breaking 25.8 inches of snow that paralyzed the nation's largest city, December 26, 1947. No more welcome was the sleet storm that followed just one week later. Certainly, no greater snow-fighting job ever had to be done.

Spearheading this fight were fleets of powerful, dependable FWD four-wheel-drive trucks. Some units actually had been commandeered from dealers' display rooms and hastily equipped with snowplows.

Yes — FWDs do the tough jobs . . . not only in emergencies, but every day. With all four wheels driving, you remove snow at speeds up to 30 miles per hour. With front wheels pulling and back wheels pushing, you slog through without bogging down. With every wheel gripping, you climb steep grades without losing speed.

And when the snow-clearing season is over, you use the same trucks to grade roads, haul gravel, and perform your other heavy-duty jobs.

To find out how FWD four-wheel-drive trucks can save you time and money on your job, see your nearest distributor or write for complete information.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario
WORLD-WIDE SALES and SERVICE

FWD

America's Foremost Heavy-Duty Truck

AGAIN THIS WINTER . . . MORE FWDs WILL BE MOVING MORE SNOW

Power-Chain Saw

Powered by two-cycle, 4-hp. motor using only 1 gal. of gasoline per day. Saw complete with cutting bar and 26-in. chain weighs only 37 lb. Control bars insure easy operation in all cutting positions. Exhaust fumes from engine are carried away from operator.—Woodbos, Inc., 2712 N. Mississippi Ave., Portland 12, Ore.

Flexible Template

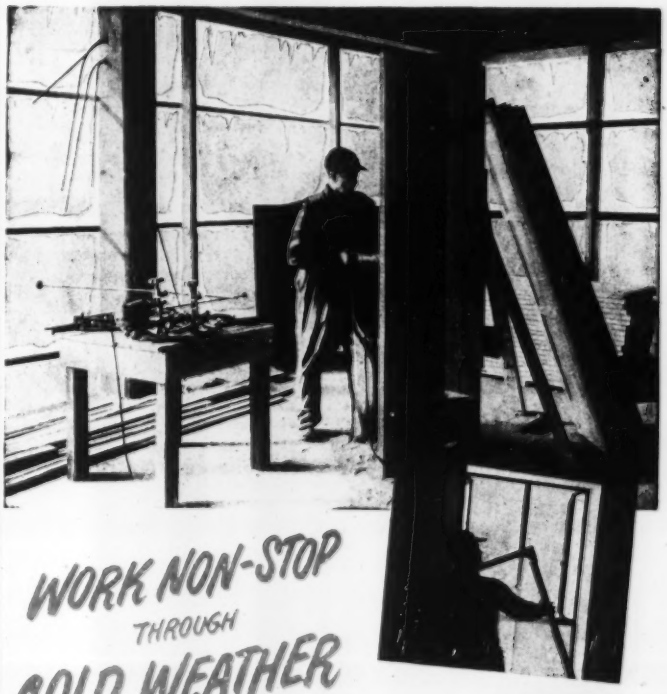
A new invention greatly speeds up layout work involving curves. It can duplicate curves full size in a matter of seconds, saving much curve plotting, drawing and template making. It can be set and locked to any desired shape, contour, curve or radius and transferred anywhere for construction or checking purposes. When unlocked it springs back to its original position. —C. H. Clark and W. E. Poggenburg, 4900 Wynnefield Ave., Philadelphia, Pa.

Hard-Facing Alloys

Two new hard-facing alloys for added wear protection on heavy equipment. These are Stoody self-hardening 21 for applications involving extreme abrasion with moderate impact and Stoody 1027 for severe impact, with moderate abrasion. Recommended for such equipment as tractor parts, power shovels, crushers, impellers and mechanical loader lips. Alloys include cromium, manganese, silicon, carbon and zirconium. Recommended for down-hand applications. — Stoody Co., Whittier, Calif.

Flexible Band Pipe Clamps

Flexible steel band repair clamp snaps over pipe to cover leaks in pipe lines. Inner sleeve can be turned around inside clamp shell in order to position clamp for easy tightening regardless of location of leak.—Morris Coupling & Clamp Co., 27 Duncan Ave., Ellwood City, Pa.



WORK NON-STOP THROUGH COLD WEATHER

with temporary enclosures of

VIMLITE*

CELANESE* PLASTIC GLAZING

Celanese Vimlite—tough flexible plastic glazing—stapled to window openings or fitted wood frames produces a weather-tight, brightly lighted interior.

With Vimlite temporary enclosures, contractors can work right through the coldest weather. Vimlite holds heat in, keeps cold out.

USE VIMLITE OVER AND OVER

Vimlite is wire reinforced and long lasting . . . can be used over and over . . . pays for its cost in no time . . . means better work and fewer man hours lost.

You can get Vimlite in 28" and 36" wide rolls—up to 100' long. If your hardware dealer or building materials supplier can not supply you return the coupon below.

*Reg. U. S. Pat. Off.

Celanese Corporation of America, Dept. H,
180 Madison Avenue, New York 16, N. Y.

Please tell me where I can obtain Vimlite.

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Address_____

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Urgently Needed • NOW It's Here

Mall One-Man SHORT COUPLED VIBRATOR

Perfect tool for placing concrete in small forms, thin wall sections or hard-to-reach spots in forms. Also for use as edge vibrator or for expansion joints on pavement work.

Compact, lightweight and shortcoupled, with 1½ H. P. electric motor built in, this Mall Vibrator is designed for one-man use. It gives all the speed, ease and efficiency of larger Mall Vibrators and can be easily carried up and down ladders and operated from scaffolding.

This new one-man unit completes the full line of Mall Concrete Vibrators. Now—whether your job is a bridge, building, culvert, sewerage treatment or disposal plant or a concrete pavement, there is a size and type Mall Vibrator to do the work efficiently and quickly.

Let your Mall Dealer help you select the proper equipment for your needs . . . or write TODAY for complete literature on Mall Vibrators.

MALL TOOL COMPANY, 7730 South Chicago Ave., Chicago 19, Ill.

IN DRY GROUND . . . OR UNDER WATER

This picture shows a flooded tailrace being cleaned out by a small Sauerman Slackline Cableway which delivered the excavated material to a screening plant on shore.

Above is a Scraper machine with traveling tower building an earth dam 30 ft. high and 5600 ft. long. The two-drum hoist that powers the scraper is mounted on a tractor.

CUT TIME IN HALF with Sauerman

Long Range Scrapers and Cableways

Write for catalog and describe your handling problems.

Digging, hauling and dumping operations are combined in one continuous process making possible big savings in both time and labor. Only one man is required for complete control of the operation. Sauerman Cableway and Scraper Machines provide wide range of handling capacities and long-reach. Remarkably low operating and maintenance costs. Gasoline, electric or Diesel.

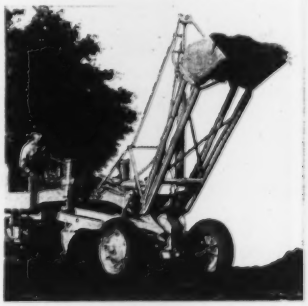
SAUERMAN BROS., Inc.

★ ★

532 S. Clinton St., Chicago 7, Illinois

Protective Hat

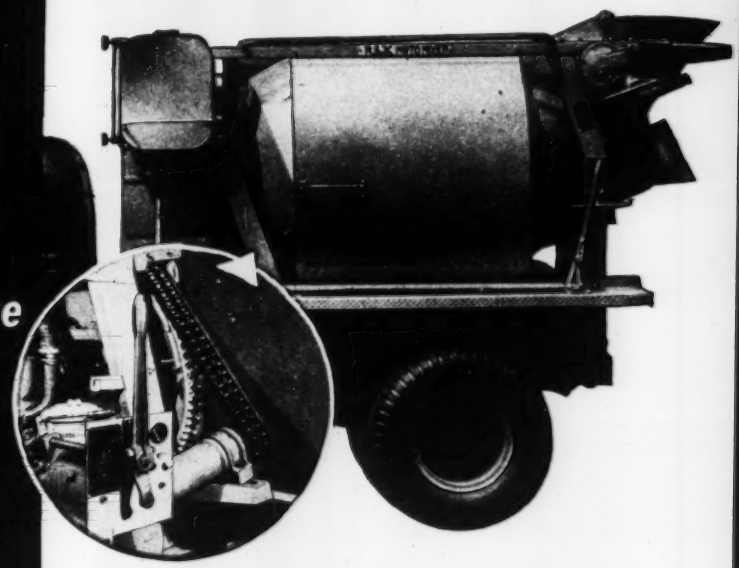
A new plastic molded "hard boiled hat" made of a new waterproof material is ready. The crown is made up of thousands of continuous reinforcements of long interlocked fibres, impregnated and bonded with a resinous binder. Impact of a falling object is partially absorbed by this resilient crown. Much of the remaining shock absorbed by the wide web hammock, which gives with a hydraulic-like action to protect the neck from serious injury. One hat size fits all heads. Adjustable sweatband provides instant sizing from 6⅞ to 7⅞. Hammock drawstring allows for further fitting.—E. D. Bullard Co., 275 Eighth Street, San Francisco 3, Calif.



Loader Attachment

Front-end loader is designed for quick attachment to the Galion maintenance motor grader. Standard material bucket has capacity of 9 cu. ft. and an extra-large snow bucket is available. Lifting height of loader is 9 ft. 10 in., dumping clearance 8 ft., and forward reach 4 ft. 6 in. Lifting operation is by hydraulic power under finger-tip control from grader seat. Loaded bucket is tripped by manual cable control.—Galion Iron Works & Mfg. Co., Galion, Ohio.

What the REX Chain Drum Drive Means to You!



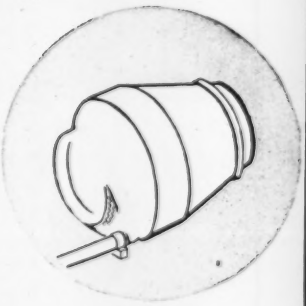
NO STRAIN WITH CHAIN

Eliminates Binding..... Accommodates Misalignments

Truck mixers are subjected to severe twists and strains as the truck weaves over rough roads. To protect transmission, gears, shafting, power plant . . . to prevent destructive binding action between drum and transmission, Rex Moto-Mixers employ the exclusive chain drum drive. This flexible drive absorbs the shocks and accommodates the *unavoidable* misalignments to which all truck mixers are subjected.

Permits Proper Weight Distribution

Thanks to the Rex Chain Drum Drive, weight can be correctly distributed in Rex Moto-Mixers. There is no need for excessively heavy frames and transmission cases or complicated transmissions, to overcome the effects of misalignment and strains. And weight saved here can be properly distributed to parts where it is needed most . . . bearings, shafting, blades, drum rollers, drum shell, drum supports.



Provides a Uniform Application of Power

The Rex Chain Drum Drive wraps more than halfway around the drum sprocket and more than one-third around the drive pinion to provide a uniform application of positive power. This positive power is applied to the drum over many sprocket teeth. Contrast this design to the gear drives of other truck mixers where the point of contact between drum gear and drive pinion is concentrated on a single gear tooth.

LONGEST LIFE . . . LOWEST MAINTENANCE . . . MORE PROFIT FOR YOU!

Have your Rex Distributor show you how the Chain Drum Drive means more profit to you. Chain Belt Company, 1633 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT

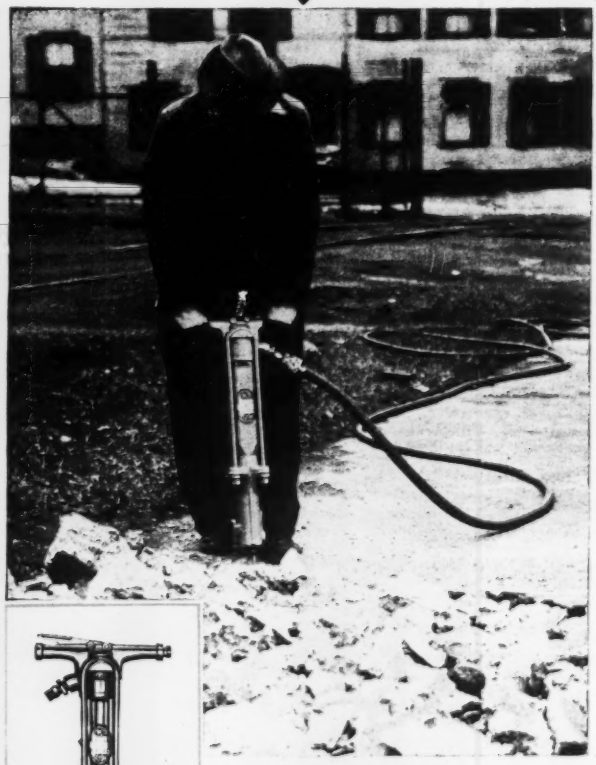
. . . REX CONSTRUCTION MACHINERY

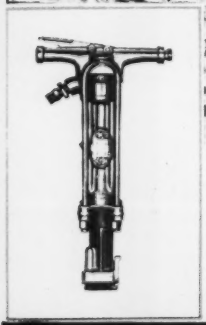
COMPANY

DO IT FASTER, CHEAPER WITH

JOY PAVING BREAKERS

They Hit Hard!

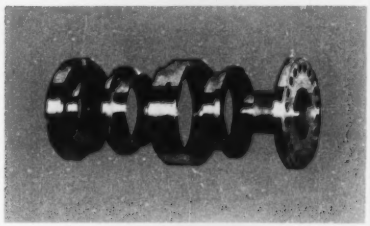




Above: the Joy K-81 Paving Breaker is a rugged tool capable of maximum output on heavy-duty work.

Left: the K-61 Paving Breaker, a powerful, easily-operated tool for all lighter demolition jobs.

JOY "Silver Streak" Paving Breakers can show you real time and cost-saving advantages. They're designed to deliver maximum piston blow, yet with a permanent "cushion" that results in smoother operation—less jarring and operator fatigue—less maintenance and replacement cost. What's more, they're cadmium-plated inside and out—an exclusive JOY feature which makes "running-in" easier and quicker, and protects against deterioration from rusting. ● Write for a bulletin, and ask for an actual demonstration—let us *prove* the superiority of JOY Paving Breakers right on your job.



The Famous JOY "Dual Valve" that makes air do more work.

In JOY Paving Breakers, the exclusive patented "Dual Valve" assures top working efficiency, and air-cushioned smoothness on both up and down strokes of the piston.

Consult a Joy Engineer

W&O C2107

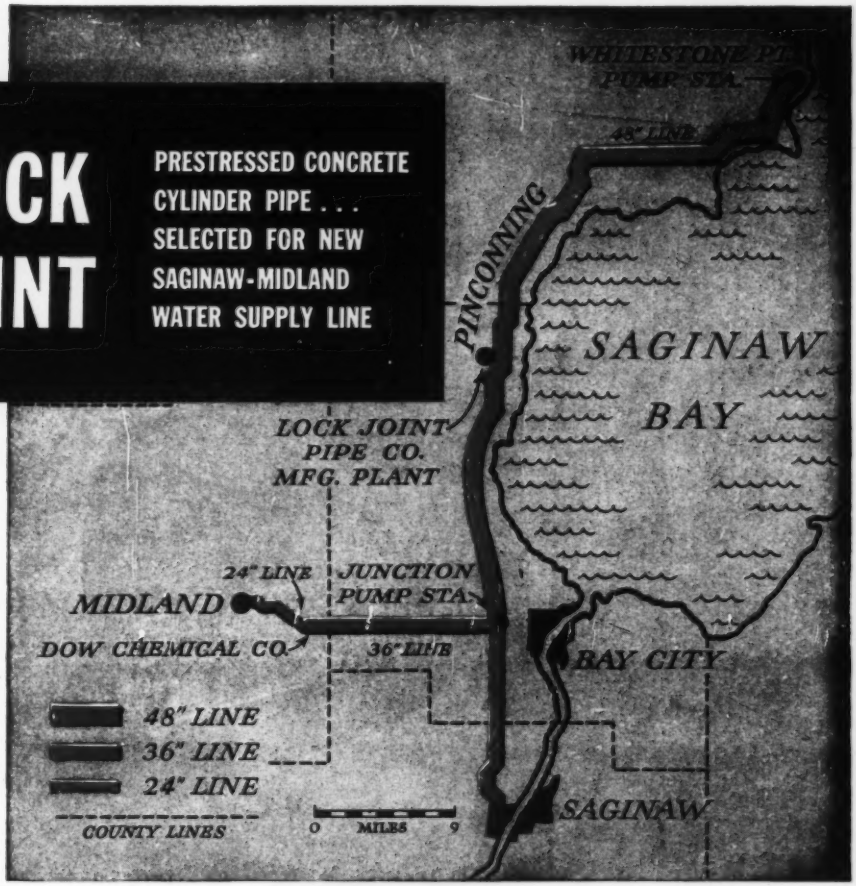
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

LOCK JOINT

PRESTRESSED CONCRETE CYLINDER PIPE . . . SELECTED FOR NEW SAGINAW-MIDLAND WATER SUPPLY LINE



ONCE AGAIN, Lock Joint Prestressed Concrete Cylinder Pipe has been selected for a major water works project.

SPECIFICATIONS issued by the Saginaw-Midland Water Supply Commission call for the manufacture and installation of 254,500 feet of 48 inch pipe . . . 143,230 feet of 36 inch pipe . . . 14,900 feet of 24 inch pipe . . . all operating at a pressure of 130 pounds.

WHEN COMPLETED, this 78 mile water supply line will be capable of delivering 23 MGD to the city of Saginaw and 20 MGD to Midland.

BY SELECTING Lock Joint Prestressed Concrete Cylinder Pipe, the Saginaw-Midland Water Supply Commission assures itself of a pipe line of maximum elasticity, permanent high carrying capacity and an estimated life of one hundred years or more.

LOCK JOINT PIPE COMPANY

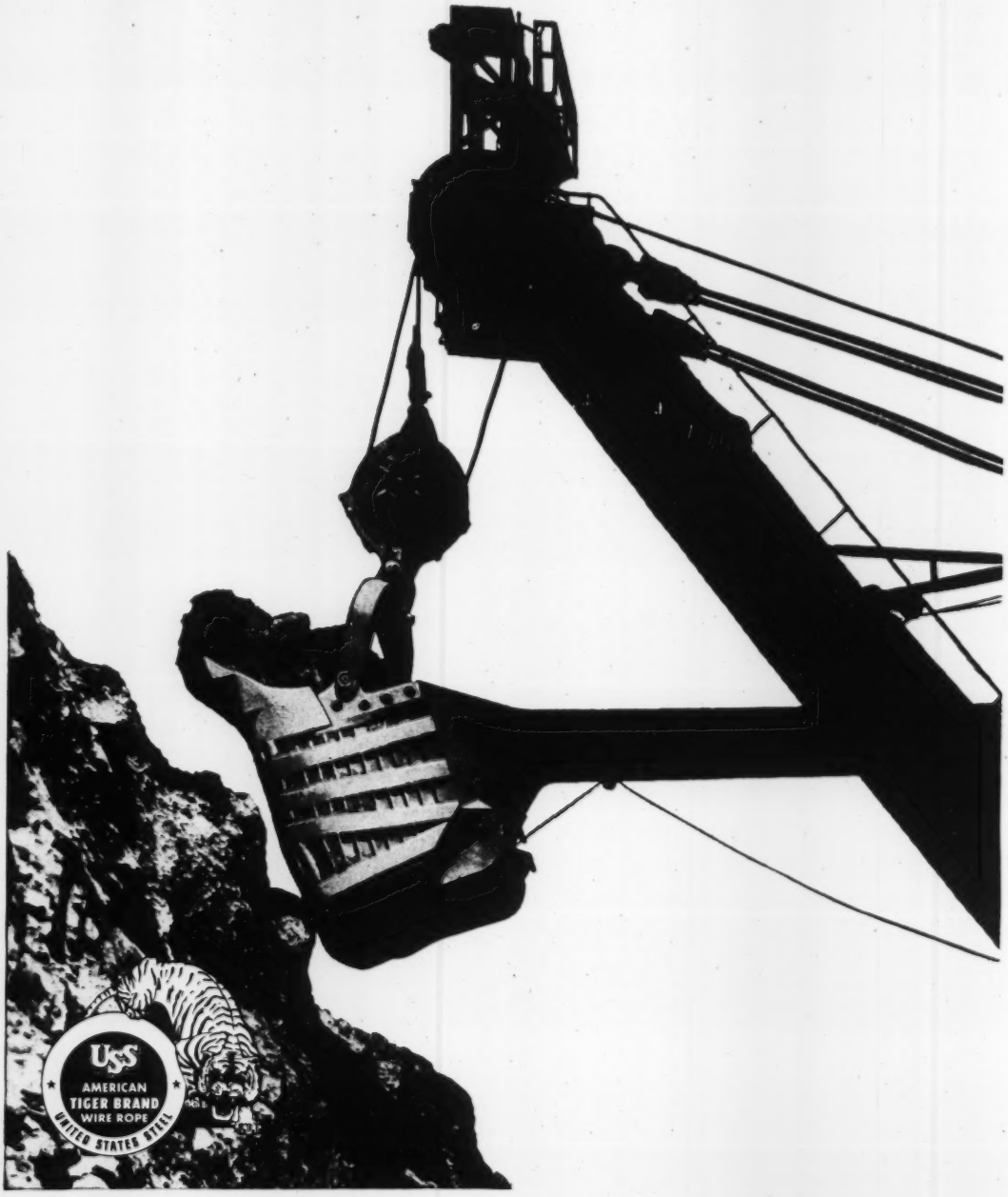
Established 1905

P.O. BOX 269, EAST ORANGE, NEW JERSEY

Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill. Joplin, Mo. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.

How the proper application



# of wire rope

-may save you money

● Every user wants to get the best possible service out of his wire rope but it is amazing how often simple rules are broken in the field. Some operators are careless when installing a new rope . . . they keep machines running when sheaves are badly worn . . . they overload the rope . . . they forget to lubricate the rope.

To help eliminate these human failings, the American Steel & Wire Company maintains a staff of TIGER BRAND Wire Rope Specialists. These men are experienced field service engineers. If you have not checked your equipment recently, for correct wire rope application, call in the TIGER BRAND Specialist. He'll do the job for you without charge. Here are some of the points he checks before recommending the proper wire rope for your job—

1. Method of installing and caring for rope.
2. Diameter of sheaves and drums, and condition of grooves.
3. Arrangement of sheaves.
4. Fleet angles.
5. Loads handled.
6. Rope speeds, acceleration and deceleration.
7. Presence of vibration, whipping.
8. Lubrication.
9. Corrosion.
10. Amount of scrubbing and abrasion.
11. Fitting attachments.
12. Abuses to be corrected.
13. Analysis of service records.
14. Finally: Recommendation of the correct rope to meet all conditions.

To show you how you can save money on wire rope, we have prepared a booklet on proper wire rope application that every user of wire rope should read. You can get a copy by mailing the coupon.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEND FOR NEW FREE BOOKLET

American Steel & Wire Company
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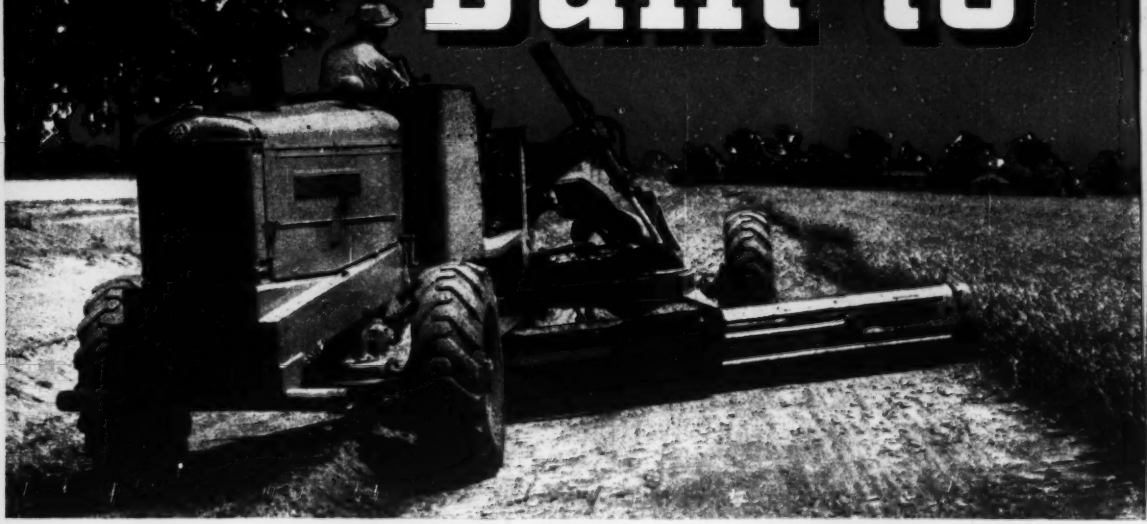
Gentlemen:
Send me your booklet, "Valuable Facts about the use and care of Wire Rope."
Name.....
Position.....
Company.....
Address.....

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

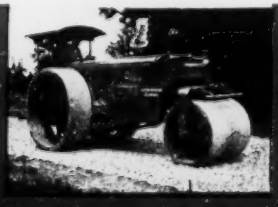
Built to



No motor grader without All-Wheel Drive and All-Wheel Steer can hope to equal the all-round operating efficiency of an Austin-Western "88-H," "99-H" or Master "99." There are no idling front wheels; all weight is on drive wheels contributing 100% traction. All-Wheel Steer provides unequalled maneuverability; saves time on every job.

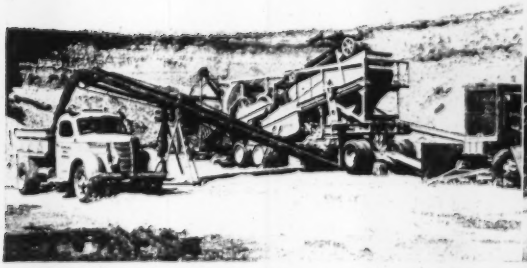
BADGER CONVERTIBLE SHOVEL. ¾-swing design eliminates tail swing; makes it possible to use the Badger in close quarters; reduces swinging weight and definitely increases work output. The Badger can be converted into a Crane, Dragline, Pile Driver, Trench Hoe, or Skimmer. Wheel mounts provide fast, easy job-to-job portability. A cab is available on special order.

MODEL "40" MOTOR SWEEPER. Fast, maneuverable, and economical in operation. No troublesome expensive conveyor or elevator to keep in adjustment and repair—dirt is thrown directly into the 2-yard hopper. Can be equipped with either right-hand or left-hand gutter broom or both. Leaf Broom attachment simplifies the collection of heavy accumulations of leaves.

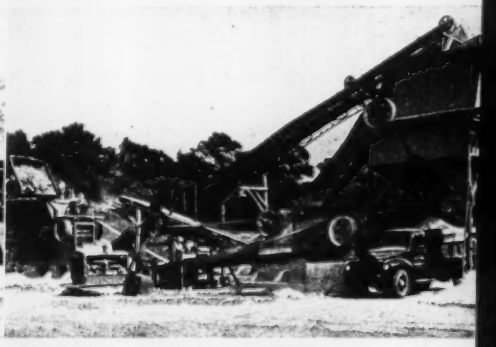


OUTPERFORM

All-Wheel Drive and All-Wheel Steer make it easy for an Austin-Western Power Grader to do a superlative job of bank sloping. The operator can do all normal ditching and grading; then high-lift the blade to any desired bank cu ting position—including the vertical—*without leaving th platform. No other grader can do it.*

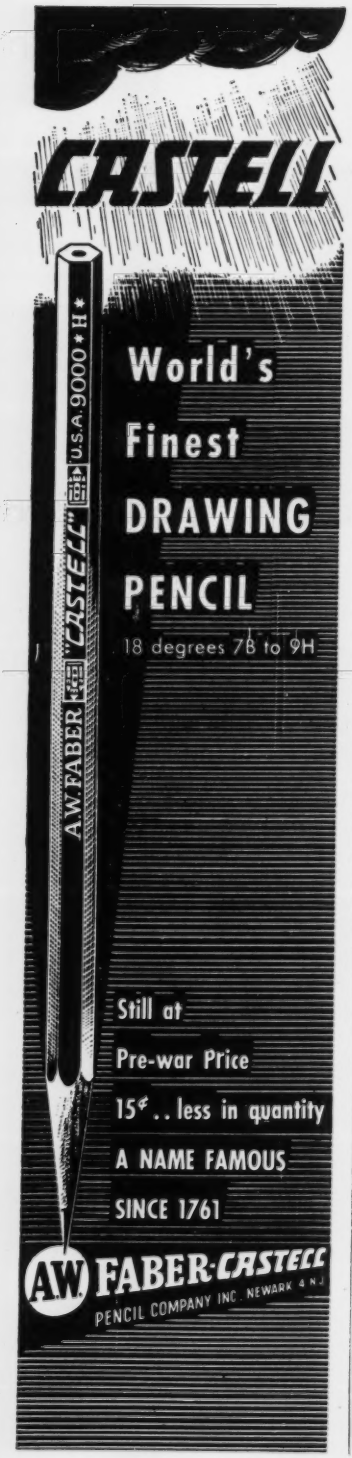


PORTABLE CRUSHING PLANTS. Built in sizes and types to fit every production requirement. Equipped with matching Crushers, Screens and Conveyors, correctly balanced to deliver the maximum amount of crushed and screened aggregate in controlled sizes. From the smallest plant to the magnificent "101" pictured above, every Austin-Western Portable Plant is engineered for low-cost tonnage.



STATIONARY CRUSHING PLANTS. This limestone plant with its t Jaw Crushers and Roll Reduction Crusher is typical of the efficiency design that characterizes every Austin-Western plant. Two men control entire operation; one at the Primary Breaker, the other to make the rou of the matching Crushers, Screens and Conveyors. Each Austin-West plant is tailor-made for its job.

AUSTIN-WESTERN COMPANY • AURORA, ILLINOIS, U. S. A.



Manufacturers' Publications

Hoisting Machinery—(19-p. bulletin.) Covers wide range of hoists, including steam, gasoline, diesel and electric, from one-drum to three-drum units. Types include gear-driven and chain-driven hoists. Also electric capstans, car-pullers and boom-swinging gears.—SUPERIOR-LIDGERWOOD-NUNDY CORP., SUPERIOR, WIS.

Dump Body for Concrete Haulage—(4-p. folder) Describes and illustrates applications of Dumpcrete, available in 2, 3 and 4-cu.yd. sizes for hauling mixed concrete. Emphasizes controlled discharge and long sectional chute to allow slow or fast discharge into buckets, hoppers or forms. Watertight body prevents leakage during haul. Illustrations show various applications on construction work.—DUMPCRETE DIVISION, MAXON CONSTRUCTION CO., INC., DAYTON 2, OHIO.

Portable Batching Plants—(24-p. booklet) Discusses road builders' aggregate and cement-handling equipment with emphasis on multiple-compartment bins with dual or single batcher. Typical plant layouts involving Johnson batching plants are shown in sketches to illustrate time and labor-saving features. New pieces of batching equipment described include all-purpose bin, high speed batcher for two, three or four materials, low-bin trolley batcher, and portable elevating cement charger. The Johnson Company is a subsidiary of the Kochring Co., of Milwaukee.—C. S. JOHNSON CO., CHAMPAIGN, ILL.

Metal Surface Protection—(12-p. bulletin) Coating called "Dum Dum for Metal" provides a tough but elastic and pliable weather-resistant, water-repellant covering that excludes moisture, vapor and chemical gases and fumes. Seven typical applications are noted along with directions for using the material (which is spray-applied) and preliminary surface preparation required.—ARCO CO., 7301 BESSEMER AVE., CLEVELAND 4, OHIO.

Rigid Steel Conduit—(64-p. catalog and handbook) Describes manufacturing processes at Spang-Chalfant plant in making three grades of rigid conduit in sizes from ½ to 6 in. These include hot-dipped galvanized and lacquered, electro-galvanized and black enameled. Complete specifications for all grades. There is a 37-p. section of reference material and tables for electrical contractors and users of conduit. Also tables of electrical data and computation of conductor sizes.—NATIONAL SUPPLY CO., PITTSBURGH.

Welding Electrode Holders—(12-p. pamphlet) Includes information on electrode holders for arc welding, ground clamps, cable connectors, splicers and cable lugs. Also information on maintenance and care of electric welding cables, connections, grounds and holders.—TWECO PRODUCTS CO., P. O. Box 666, WICHITA, KANSAS.

Building Drainage Products—(8-p. pamphlet) Describes cloudburst type roof drains, adjustable-level floor drains, grease interceptors, wall closet fittings and carriers for wall type fixtures. Roof drains are designed for use in prefabricated steel decks, wood, concrete or other types of roof construction. Floor drain makes possible level adjustment without resort to chipping of concrete.—J. A. ZORN MFG. CO., ERIE, PA.

Welded Connection Units—(56-p. manual) Engineering data on recommended practice for Saxe system of welded connection units for erection of welded steel structures. Simple hook-and-eye principle locks steel members in position and self-aligning action eliminates hours of costly plumbing up. In field erection work system utilizes seat and clip for positioning structural steel members.—J. H. WILLIAMS & CO., 400 VULCAN ST., BUFFALO 7, N. Y.

Dry Material Weighing—Bulletin describes the new Builders Conveyoflo Meter for continuously weighing and totalizing the flow of dry materials. It also is used for automatic proportioning and controlling of dry or liquid feeders for secondary ingredients. This meter operates with pneumatic diaphragms. It is highly accurate over a wide range and simple to install on new or existing conveyor systems.—BUILDERS-PROVIDENCE, INC., 51 CODDING STREET, PROVIDENCE, R. I.

Gravity Dams—Plans and techniques for the building of gravity dams and walls with Atlas steel form (cantilever design) are described in a 4-page brochure which contains instructional material, including "Typical Details of 'A' Frame Hoists, Showing Use on Upstream, Downstream, and Bulkhead Forms," and "Details of Special Forms at Pier over Weir and Application of Standard Forms for Crane-Handle Pier Forms." There is also an illustration of typical layouts for training wall forms. The pamphlet points out that Atlas Speed Wall Units may be used

(Continued on page 122)

UNIVERSAL VITRIFIED *and* UNITED STATES CONCRETE

ARE *Keenly Alive*

TO TODAY'S TREND TOWARD THE HIGHER CONSTRUCTION COSTS *that Cause Delays in Work Progress.*

Both companies know and share with other industry, the mounting cost problems that are common to all. Both recognize that engineers and members of municipal, county and state boards are deserving of recognition for almost superhuman accomplishment.

Universal Vitrified and United States Concrete want, also, to help as well as to encourage. Available to you are:

(1) Modern plants that give advantage in location.

(2) Clay deposits that give advantage in raw materials.

(3) Mechanized facilities that give advantage in manufacturing.

(4) Immense capacity and the "know how" of experience.

(5) Availability of both Vitrified Clay and Concrete Pipe in full range of sizes.

UNIVERSAL VITRIFIED AND UNITED STATES CONCRETE PRODUCTS

Sewer Pipe, Liner Plates, Aerodrane Filter Block, Slipseal Sewer Joint, Segment Block, Meter Boxes, Ship-Lap Wall Coping, Septic Tanks, Drain Tile, Flue Lining, Stove Pipe, Chimney Tops, Chimney Pots, Fire Brick, Fire Clay

SALES OFFICES: Baltimore, Md., Box 7769, Halethorpe Branch, Telephone, Elkridge 790—Cincinnati, Ohio, P. O.—Newton, Ohio, Box 215, Telephone, Locust 7846.

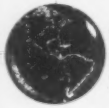
FACTORIES: Baltimore, Md., Cincinnati, Ohio, New Philadelphia, Ohio, Palmyra, Ohio (2), Uhrichsville, Ohio (2).

UNIVERSAL SEWER PIPE CORPORATION
UNITED STATES CONCRETE PIPE COMPANY

GENERAL OFFICES • 1500 Union Commerce Building • CLEVELAND 14, OHIO

NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM!

CHOOSE . . . as others have — THE MODEL THAT BEST FITS YOUR NEEDS!



There's a Schramm Air Compressor, size and model, to meet your specific needs!

Below are listed nine of the many Schramm models, portables ranging from 20 to 420 cu. ft. of actual air, the stationary ranging from 2 to 600 cu. ft. displacement.

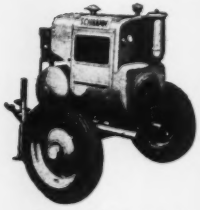
On all models performance records are evidence of their high quality. You will find the name Schramm written on every important page in compressor history.

Features you get in Schramm are: 100% water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication, and electric-starter starting. All Schramms are compact, lightweight, easy to operate.

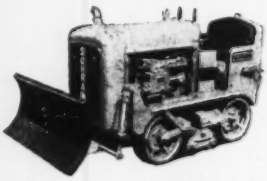
We invite you to write today for fully illustrated catalog describing in detail each of the Schramm Air Compressors shown here . . . plus a wide range of other models. We feel the Schramm story is a good one, and offers you a sure way to get your many compressed air jobs done quickly, efficiently, and economically.

SCHRAMM INC.

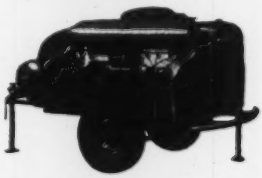
THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA



20/35 Model Compressor



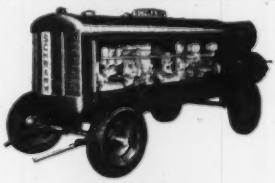
Self-Propelled with Hydraulic Backfill Blade



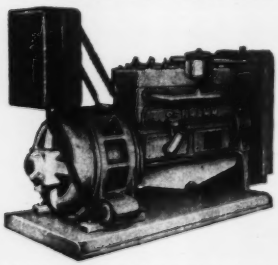
Two-Wheel Trailer Mounting with Tool Boxes

Skidded for Truck Mounting

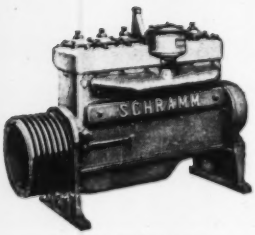
Truck Mounted



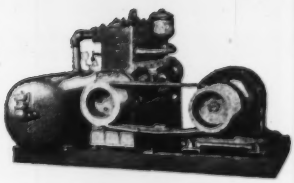
Diesel Engine Drive



Built-in Motor Drive with Cooling Unit and Starter

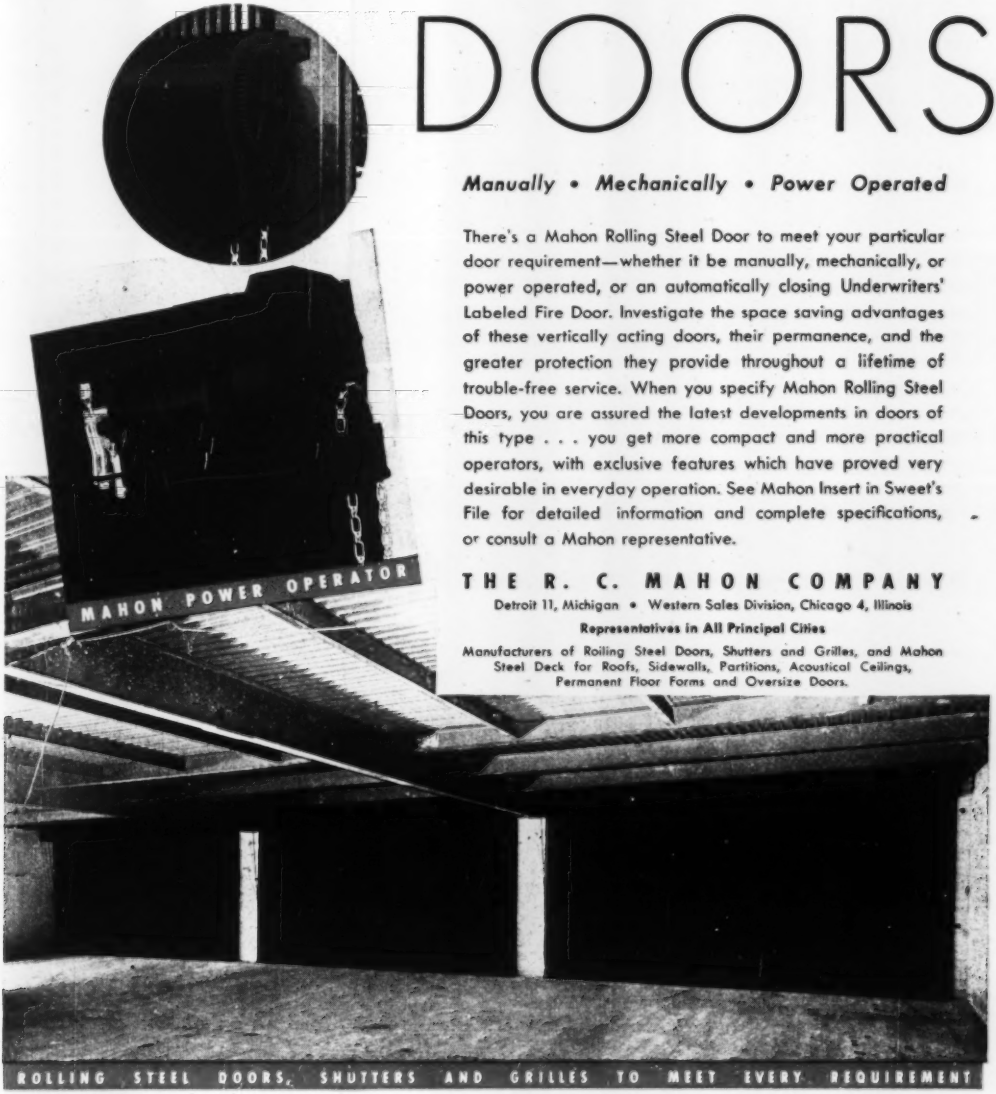


"V" Belt on Flat Pulley Drive



"V" Belt Drive with Air Receiver

Rolling Steel DOORS



Manually • Mechanically • Power Operated

There's a Mahon Rolling Steel Door to meet your particular door requirement—whether it be manually, mechanically, or power operated, or an automatically closing Underwriters' Labeled Fire Door. Investigate the space saving advantages of these vertically acting doors, their permanence, and the greater protection they provide throughout a lifetime of trouble-free service. When you specify Mahon Rolling Steel Doors, you are assured the latest developments in doors of this type . . . you get more compact and more practical operators, with exclusive features which have proved very desirable in everyday operation. See Mahon Insert in Sweet's File for detailed information and complete specifications, or consult a Mahon representative.

THE R. C. MAHON COMPANY

Detroit 11, Michigan • Western Sales Division, Chicago 4, Illinois

Representatives in All Principal Cities

Manufacturers of Rolling Steel Doors, Shutters and Grilles, and Mahon Steel Deck for Roofs, Sidewalls, Partitions, Acoustical Ceilings, Permanent Floor Forms and Oversize Doors.

Three Mahon Power Operated Rolling Steel Doors, 26' x 12'-6", Recently Installed in the New Plant of Peninsular Metal Products Corp., Detroit, Michigan.

MAHON

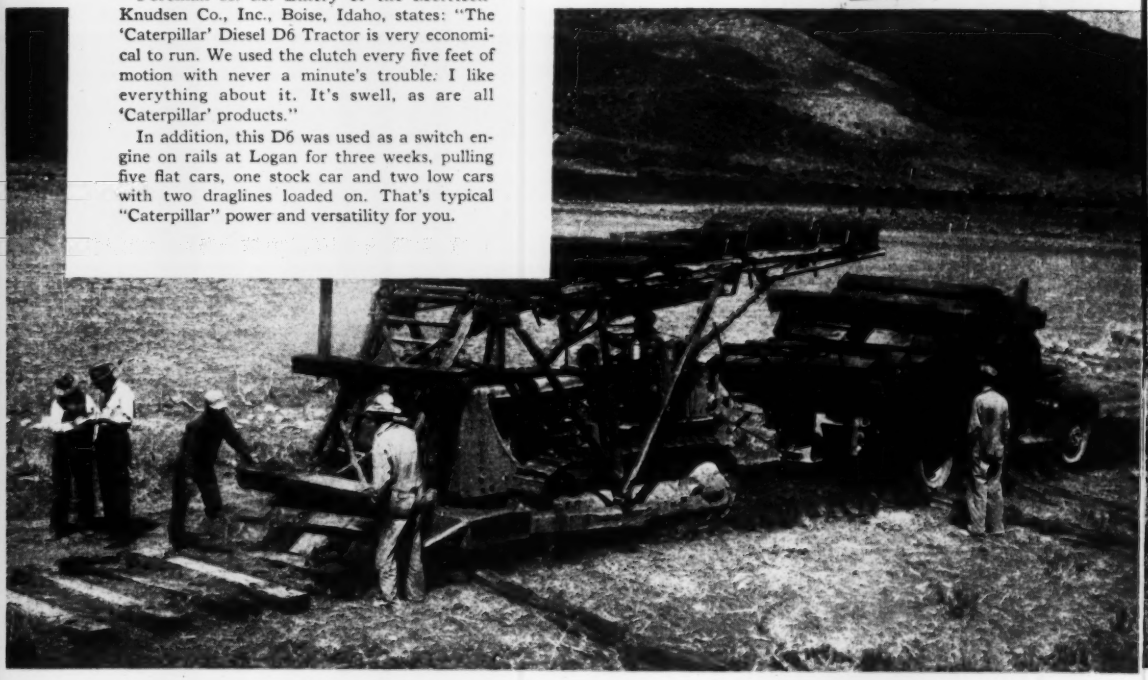
"CATERPILLAR"

. . . for this

On this job in the San Pete Valley, a "Caterpillar" Diesel D6 Tractor with a specially built tie loader picks up ties on a branch line of the Denver & Rio Grande Railroad between Moroni and Nephi. It salvaged 38,000 ties in 18 working days—an average of 2100 ties a day.

Foreman H. M. Emery of the Morrison-Knudsen Co., Inc., Boise, Idaho, states: "The 'Caterpillar' Diesel D6 Tractor is very economical to run. We used the clutch every five feet of motion with never a minute's trouble. I like everything about it. It's swell, as are all 'Caterpillar' products."

In addition, this D6 was used as a switch engine on rails at Logan for three weeks, pulling five flat cars, one stock car and two low cars with two draglines loaded on. That's typical "Caterpillar" power and versatility for you.

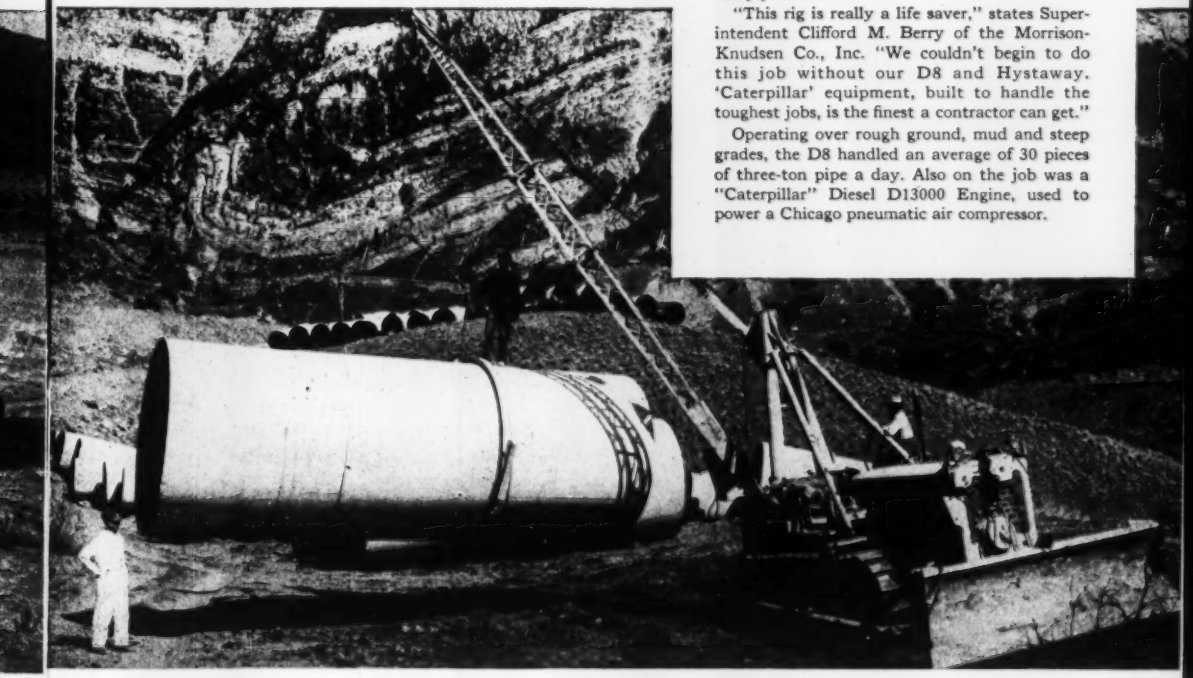


Both of these Utah jobs are different, unusual, tough. Both call for imagination, know-how, power—rugged, dependable, versatile power. Morrison-Knudsen Co., Inc., top-flight contractors of Boise, Idaho, supplied the imagination and know-how. For power they used "Caterpillar" Diesel equipment. On both jobs, "Caterpillar" came through with colors flying.

Wherever, whenever and whatever the job, you can always count on versatile "Caterpillar" Diesel equipment for standout performance. It adapts itself to conditions

has what it takes

. . . for this



ON THIS JOB in Provo Canyon, a "Caterpillar" Diesel D8 Tractor with Hystaway and 'dozer is a one-man crew installing 8'6" steel pipe—each piece weighing three tons—to replace wood flume 14,400 feet long. First it roughs out the path for the pipe and shovel—then unloads and carries the pipe into line.

"This rig is really a life saver," states Superintendent Clifford M. Berry of the Morrison-Knudsen Co., Inc. "We couldn't begin to do this job without our D8 and Hystaway. 'Caterpillar' equipment, built to handle the toughest jobs, is the finest a contractor can get."

Operating over rough ground, mud and steep grades, the D8 handled an average of 30 pieces of three-ton pipe a day. Also on the job was a "Caterpillar" Diesel D13000 Engine, used to power a Chicago pneumatic air compressor.

that stop less husky equipment—and licks them. In the process it keeps costs down—and that means more profit for you. And you have the added advantage of reliable service from one well-equipped dealer.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

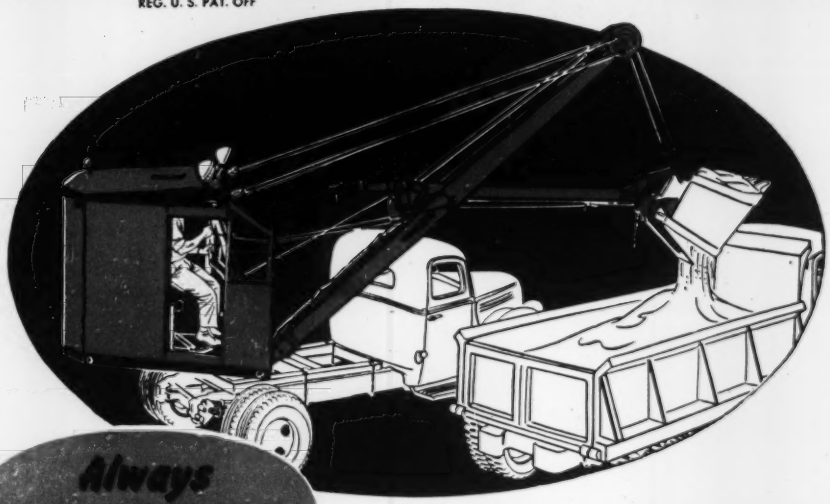
CATERPILLAR DIESEL

REG. U. S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

"QUICK-WAY" TRUCK SHOVELS

REG. U. S. PAT. OFF



Always DEPENDABLE

Yes, **"QUICK-WAYS"** are dependable—and economical, quick and profitable to you. **"QUICK-WAY'S"** accurate balance and strength with light weight permit higher travelling and working speeds, more yardage per day. Simplicity of design and quality steel construction give longer working life, lower operating and maintenance costs, lower initial cost and easier servicing. There's a **"QUICK-WAY"** owner near you, ask HIM.

1. **Wherever a truck can go, and at truck speed, that's where you can take a "QUICK-WAY." Low center of gravity and proper balance does it.**

2. **Speed on the job moves more material per day at less cost—a "QUICK-WAY" gets around *fast*.**

3. **First in the field and still the leader, "QUICK-WAYS" have gotten around more and longer than any other truck mounted power shovel.**

Service available from our distributors strategically located throughout the United States and worldwide

Model E: 4/10 cu. yd. cap., for mounting on any standard 5-ton truck.
Model J: 1/4 cu. yd. cap., for mounting on any standard 1½-ton truck.

"QUICK-WAY"

For speed, portability, economy of operation, and adaptability to a wider range of jobs, nothing of comparable size equals a "Quick-Way" Truck Shovel.

"QUICK-WAY" TRUCK SHOVEL CO.

DENVER, COLORADO

This is a one-man hose!

Hewitt Cement Placement Hose saves time and labor on cement jobs

Here's a rugged cement hose so light and flexible that it's truly *a one-man hose!*

It is Hewitt Cement Placement Hose.

Its tough, smooth gum rubber inner tube gives you extra resistance to abrasion. And its carcass of heavy plies gives you *added* hose strength. That's because each ply is bonded to a thick layer of pure gum rubber!

This makes the usual heavy outer cover unnecessary . . . reduces hose weight!

No wonder rugged Hewitt Cement Placement Hose is so widely used by engineers and contractors! They find it saves them time and money whether they're building cement mine reinforcements, tunnels, viaducts, or bridges and the like.

Remember, Hewitt Cement Placement Hose gives you longer hose life because of its extra strong wall with multiple-ply reinforcement. It also provides greater resistance to expansion because of the thick layer of pure gum rubber bonded to each ply.

Find out how Hewitt Hose can save time and labor on *your* construction jobs. See your Hewitt distributor. Or write Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N.Y.

HEWITT

Cement Placement Hose

HEWITT RUBBER DIVISION
INDUSTRIAL HOSE • BELTING • PACKING

RELY ON THESE HEWITT PRODUCTS FOR ALL ENGINEERING AND CONSTRUCTION JOBS

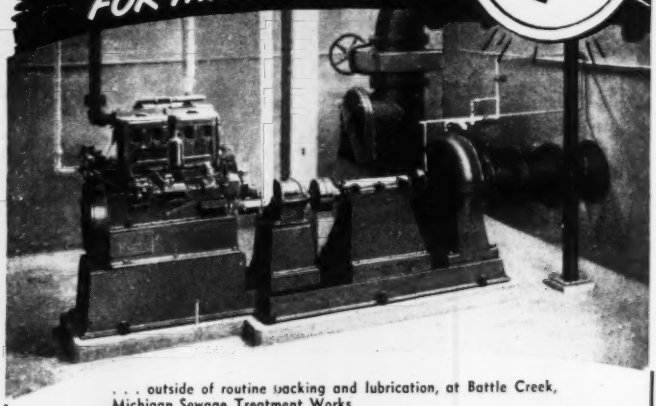
Hewitt Air Hose
Hewitt Water Hose
Hewitt Steam Hose
Hewitt Twin-Weld Hose
Hewitt Sand Suction Hose
Hewitt Water Suction Hose
Hewitt Road Builder's Hose
Hewitt Jetting and Grout Hose
Hewitt Street and Sewer Flushing Hose
Hewitt Ajax Conveyor Belt
Hewitt Monarch Transmission Belt

HEWITT-ROBINS HR **INCORPORATED**

Economy NON-CLOGGING PUMP DELIVERS 30 BILLION GALLONS...

"NOT ONE RED CENT FOR MAINTENANCE"

1¢



. . . outside of routine oiling and lubrication, at Battle Creek, Michigan Sewage Treatment Works

"In spite of the excessive wear received due to materials handled," the chief operator of this installation reports outstanding records of performance for a group of ECONOMY Non-Clogging Pumps. "Absolutely trouble-free service" is the rating given 4-, 7- and 8 million gallons per day units.

And it's the same everywhere . . . at lift stations, flood control installations, storm water removal units, reduction plants, drainage set-ups . . . ECONOMY Pumps have set records applauded by operating and design engineers alike.

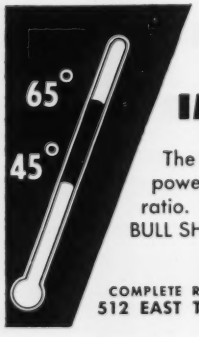
The possibilities of ECONOMY Non-Clogging Pumps in community, industrial and drainage applications are endless. If you need pumps to handle solids with the efficiency of clear water pumps, contact your ECONOMY Engineer. He'll gladly explain the many advantages of ECONOMY Pumps. Write Dept. CB-1 for catalog F-245, illustrating and detailing Vertical and Horizontal Non-Clogging Pumps, together with installation, performance and size data.

Centrifugal, Axial and Mixed Flow Pumps for all applications.

Economy Pumps Inc.

Division of Hamilton Thomas Corp.

HAMILTON, OHIO



IS 45° to 65° CONCRETE SPECIFIED?

IT'S EASY WITH THE

IMMERSION METHOD

(PATENTS PENDING)

The Immersion Method will lower plant cost, lower power cost, and maintain accurate water-cement ratio. It is now in use on 2,100,000 c. y. pour at BULL SHOALS DAM, MOUNTAIN HOME, ARKANSAS.

ROYAL McSHEA

COMPLETE REFRIGERATING PLANTS ENGINEERED, SOLD, AND ERECTED

512 EAST TWENTY-FIRST STREET . . . WICHITA 2, KANSAS

(*Continued from* page 114)

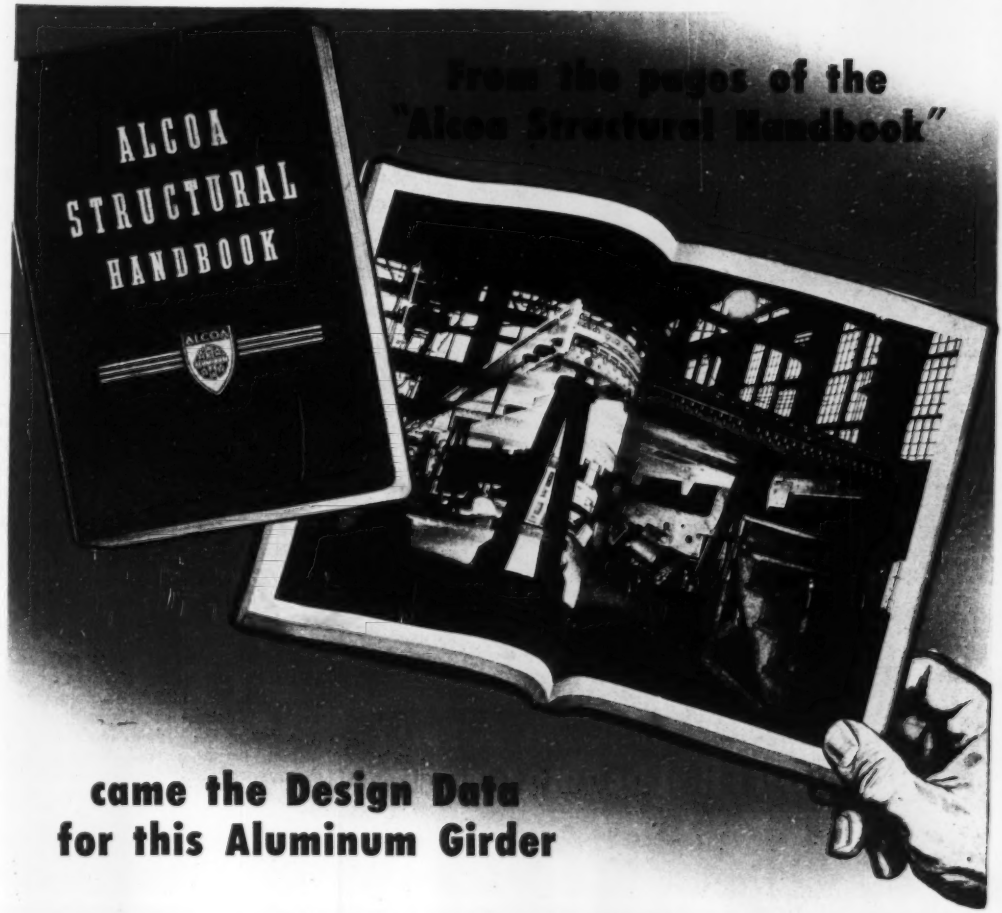
for starter forms and other purposes before and after their use in the cantilever assembly.—IRVINGTON FORM & TANK CORP., IRVINGTON, N. Y.

Concrete Mixtures Manual — (70-p. booklet) "Design and Control of Concrete Mixtures" presents basic information on how to produce quality concrete which should be helpful to every engineer and construction man. The publication comprises 12 chapters dealing with a range of topics including: Fundamental Facts about Concrete, Materials (cement, mixing water, aggregates and admixtures); Design of Concrete Mixtures; Measuring Materials; Mixing Concrete, Field Control Tests; Handling and Transporting Concrete; Placing Concrete; Joints; Curing and Protection; Removal of Forms; Finishing; Special Types of Concrete; Specifications and Tests. Here in only 70 pages is a comprehensive summary of essential information for users or designers of concrete. The presentation combines clarity with conciseness, and the text matter is complemented by drawings, tables and photographs. This booklet answers the questions of those seeking how to produce strong, durable concrete by proper selection and proportioning of materials, and how best to transport concrete and place it in forms.—PORTLAND CEMENT ASSOCIATION, 33 W. Grand Ave., Chicago 10.

Heavy-Duty Bucket Loaders—(12-p. pamphlet) gives principal specifications of various models of Haiss heavy-duty bucket loaders equipped with integral swivel belt-conveyor discharge, and describes and illustrates with large pictures advantages of various applications of this type of materials loading. Circular is identified as No. SBC-1048.—PETTIBONE MULLIKEN CORP., 4700 W. Division St., Chicago 51, Ill.

Diesel Crawler Tractors — (Four folders) Deal with diesel tractor models TD6, 9, 14 and 18, ranging in drawbar horsepower from 29.5 to 80.5. Information includes detailed specifications for each model and description of principal mechanical features.—INTERNATIONAL HARVESTER CO., 180 N. Michigan Ave., Chicago 1, Ill.

Pneumatic Grouter—(4-p. folder) Describes Mayo pneumatic grouter for placing low-pressure grout in tunnels, mines, shafts and foundations. Contains a discussion on the general subject of grouting and describes operation of Mayo unit with sketch showing principal parts. This grouter is designed for working pressures of 100 psi.—ROBERT S. MAYO, LANCASTER, PA.



came the Design Data for this Aluminum Girder

Before you start your structural designs, get a copy of the "Alcoa Structural Handbook". Then you can be sure to make *all* the weight savings that aluminum's high strength-weight ratio can give.

Aluminum structures usually have about one-half the weight of the same structure in steel . . . and with no loss of strength or rigidity . . . when you *start* designs in Alcoa Aluminum.

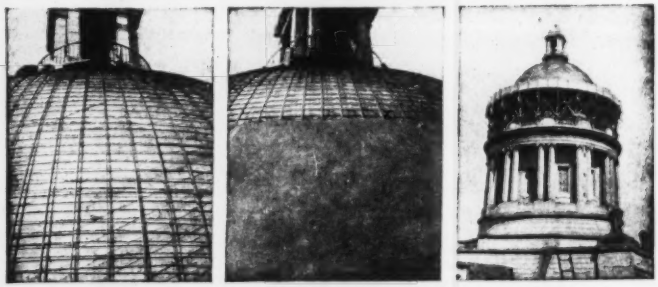
You can fabricate aluminum with standard methods and standard tools. Maintenance after erection is lower because aluminum resists attack by most industrial fumes and atmospheres.

Ask your nearby Alcoa sales office for a copy of "Alcoa Structural Handbook", and for engineering advice and help . . . toward the day when the world demand for aluminum no longer exceeds the supply.

ALUMINUM COMPANY OF AMERICA, 2108 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in 55 leading cities.

ALCOA FIRST IN **ALUMINUM**

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



REBUILT WITH "GUNITE"

The photos show the 48' diameter dome of the Kentucky State Capitol at Frankfort. This dome was originally wood construction which deteriorated and necessitated replacement. The new dome was constructed of 3" reinforced "GUNITE" by this organization.

"GUNITE" provides the structural dome and is covered with decorative glazed tile. We did this work in 1941 under the supervision of Roberts and Schaefer, Architects.

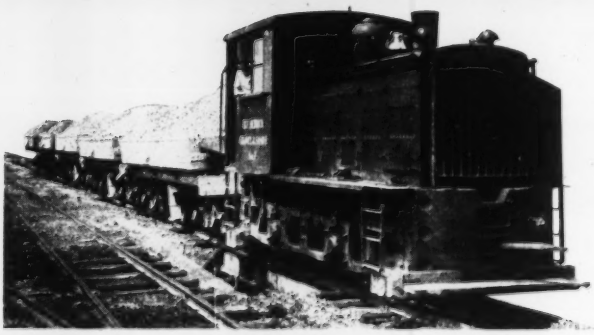
The dome type of "Gunite" roof construction is also utilized extensively in roofing old or new circular reservoirs.

Our 64-page bulletin A2400 describes this work and scores of other profitable uses of "GUNITE."

WRITE FOR BULLETIN A2400 TODAY.

MANUFACTURERS OF THE "CEMENT GUN"

MEN Who Know Equipment SPECIFY
PLYMOUTH Locomotives



Over a period of many years, under all kinds of operating conditions, PLYMOUTH Locomotives have established proved records of dependable performance. Economical to use and economical to maintain, PLYMOUTH Locomotives are built well—and built right—by careful engineering planned to meet exacting requirements in the construction field. We feel sure there's a PLYMOUTH Locomotive to meet your particular needs. Write for complete details today.

FOR COMPLETE DETAILS WRITE TODAY

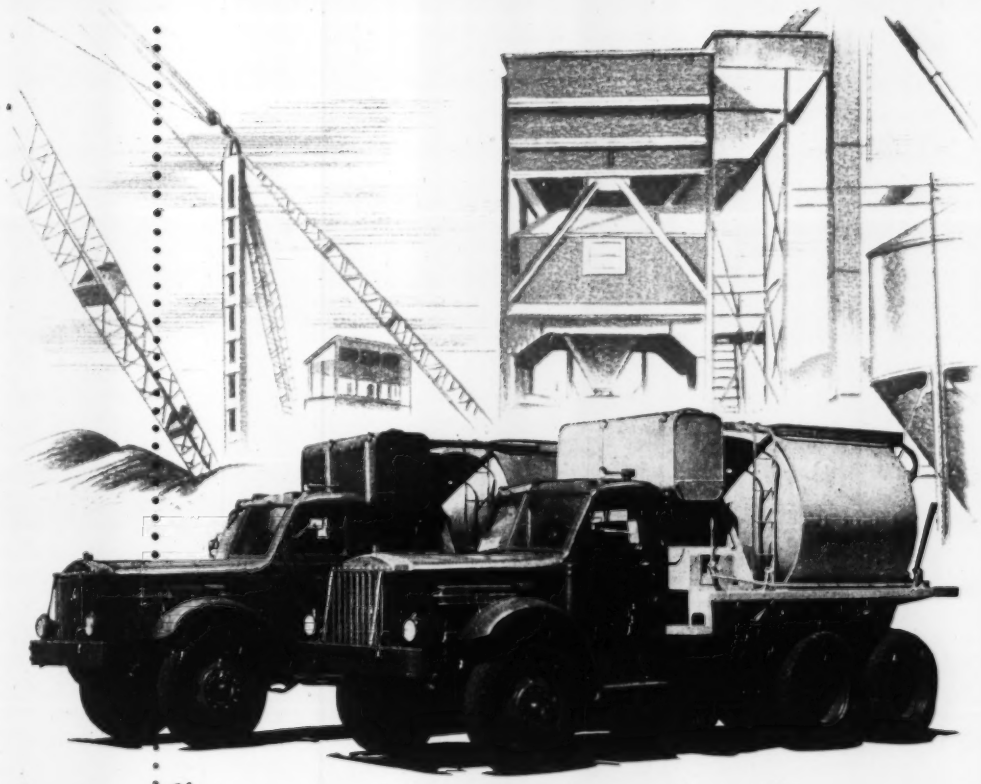
PLYMOUTH LOCOMOTIVE WORKS

DEPT. A-4 PLYMOUTH, OHIO

Manufacturers' Activities

Sales—George O. With, former manager of sales, construction industries, for U. S. STEEL SUPPLY Co., has become assistant vice-president, and his former place will be taken by Dwight L. Merrell. Clifford W. Lord has been elected vice-president in charge of all Pacific Coast warehouses, including the new ones at Portland, Ore., and Seattle, Wash. A separate stainless steel sales division has been established by the AMERICAN STEEL & WIRE Co., with B. E. Eudy as manager . . . Wm. S. Hawkins is division sales manager of the Oscoon Co. and the GENERAL EXCAVATOR Co. of Marion, Ohio, for Texas, Oklahoma, Kansas, Missouri, Iowa and part of Nebraska . . . Perry E. West has been appointed director of sales promotion for ASSOCIATED WOOD PRODUCTS Co., of California and Oregon, structural timber contractors, which recently has opened a Portland, Ore., branch under Jack D. Godfrey . . . Robert L. Somerville is assistant general sales manager for EXIDE batteries, ELECTRIC STORAGE BATTERY Co. . . . J. Roger Hayden has been promoted to assistant industrial sales manager of the Columbus, Ohio, division, INTERNATIONAL DERRICK & EQUIPMENT Co. . . . C. B. McGehee has resumed as general manager of sales of TRUSCON STEEL Co., Youngstown, Ohio . . . Eugene C. Schum is diesel engine sales manager of the Hamilton, Ohio, division of the LIMA-HAMILTON CORP. . . . John F. Van Way is Midwest district sales manager at St. Louis, Mo., for BYERS MACHINE Co., Ravenna, Ohio . . . For SYNTRON Co., Homer City, Pa., Mark Chisholm has been made district sales manager at Des Moines, Ia.; Ernest K. Hood at Kansas City, Mo.; and R. K. Bentzien has been added to the Milwaukee, Wis., sales office staff.

Distributors—To handle executive sales and service for Madsen asphalt plants, Johnson float finishes, travel-mix plants and aggregate handling equipment for MADSEN IRON WORKS of Huntington Park, Calif., the following have been appointed: MOTT HAVEN EQUIPMENT, 211 E. 149th St., New York; HUNTER TRACTOR AND MACHINERY Co., 327 So. 16th St., Milwaukee, Wis.; and the BARRIOS Co., 227 International Trade Mart, New Orleans, 12 La. . . . DALTON-COOPER, INC., have the exclusive sales representation for Turkey for JUMBO STEEL PRODUCT Co., Azuza, Calif.



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with Sterling heavy duty motor trucks

Many satisfied contractors throughout the United States have made Sterling heavy duty motor trucks their choice for efficient heavy duty service.

Engineered for the job, and built with maximum efficiency they render dependable service with the minimum of operating costs.

For your next tough job, choose Sterling and you will choose the finest in performance and dependability.

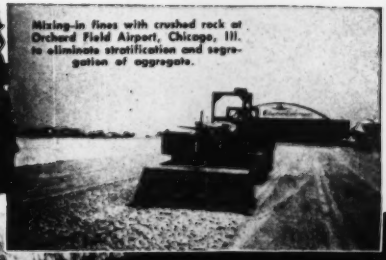
Write Sterling Motors Corporation, Milwaukee, Wisconsin or contact your nearest Sterling representative for additional information on the wide variety of Sterling models that are available.

STERLING MOTORS CORPORATION
Milwaukee 1, Wisconsin

● Enclosed Drive ● Chain Drive ● Gasoline ● Diesel
● Four Wheel ● Six Wheel ● Multi Wheel Drive (4x4 and 6x6)

BRANCHES AND DEALERS IN PRINCIPAL CITIES

SEAMAN Pulvi-Mixer Builds a More Durable... More Stable... Macadam Base!



Mixing-in fines with crushed rock at Orchard Field Airport, Chicago, Ill. to eliminate stratification and segregation of aggregate.

The Seaman leaves a loose, level surface ready for immediate compaction. Note smooth surface left by roller which immediately followed the previous-pass of the Seaman.

Mixing fine slag and 4" crushed slag to form a durable, stable base ready for immediate compaction on this Pennsylvania road. Tough going in 4" slag but the Seaman is built for heavy-duty service. Selective speed transmission adapts rotor speed to job requirements.

SEND FOR THIS FREE BOOKLET "Macadam Base Construction Methods" contains the latest information, descriptions, methods and procedures for Macadam base construction. Ask for Bulletin No. 60.

Modern Macadam is Pulvi-Mixed

A road is no better than its base. That is why more and more modern Macadam base roads are being built with Seaman Pulvi-Mixers . . . to assure uniform depth and blend of the aggregate, prevent the segregation and stratification of materials, and provide a more stable, more durable base. The Seaman Pulvi-Mixer leaves a thoroughly blended, homogeneous texture ready for immediate compaction.

Where fines are employed as binder, the Seaman disperses them thoroughly, from top to bottom, filling the voids and assuring a more positive keying and locking of the aggregate. At the same time it leaves sufficient fines level with the surface, for smooth rolling and compaction. It also saves hundreds of man hours per mile by eliminating the slow, costly "hand brushing-in" of the fines.

Seaman Pulvi-Mixers are equally effective in the mixing-in-place of crushed stone, slag, chats, gravel, etc., with water, tar, asphalt, Portland cement or other binders. No matter what your job may be, a Seaman will provide a better mix for longer-lasting, low-cost road construction.

SEAMAN MOTORS, INC.

281 North 25th, Milwaukee, Wisconsin

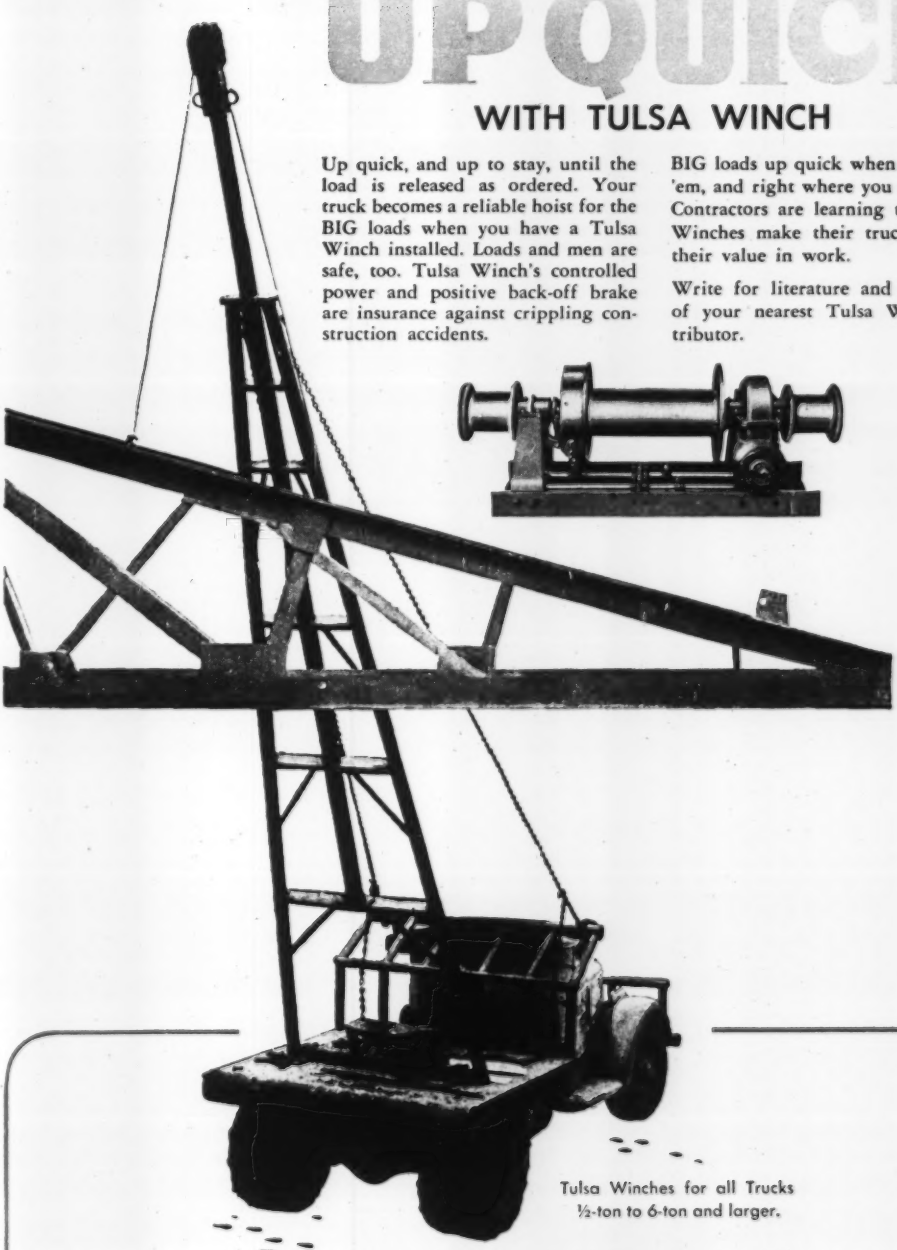
UP QUICK

WITH TULSA WINCH

Up quick, and up to stay, until the load is released as ordered. Your truck becomes a reliable hoist for the BIG loads when you have a Tulsa Winch installed. Loads and men are safe, too. Tulsa Winch's controlled power and positive back-off brake are insurance against crippling construction accidents.

BIG loads up quick when you want 'em, and right where you want 'em. Contractors are learning that Tulsa Winches make their trucks double their value in work.

Write for literature and the name of your nearest Tulsa Winch distributor.



Tulsa Winches for all Trucks
½-ton to 6-ton and larger.

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TULSA, OKLAHOMA
DIVISION OF VICKERS Inc.

A TRICKY CONSTRUCTION PROBLEM

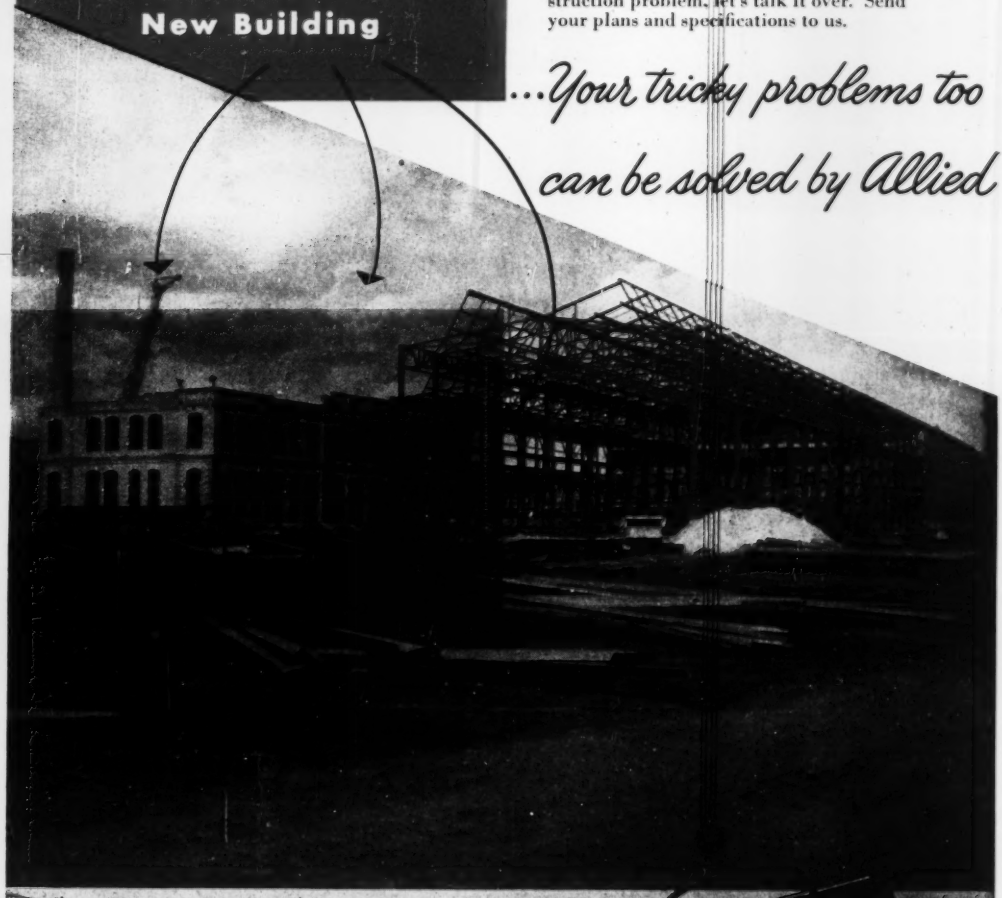
This Office Building Remained in Service During Erection of New Building

While Allied erection crews "buttoned up" the structural units of this new industrial building, business in the adjacent office building went on as usual.

Allied crews are quick to adapt themselves to trying conditions. They promptly draw on their vast reserve of precision shortcuts to get the building up with minimum fuss . . . in scheduled time.

If you have plans and specifications ready on a building that presents a baffling construction problem, let's talk it over. Send your plans and specifications to us.

...Your tricky problems too can be solved by Allied



3 PLANTS WORKING AS ONE HUGE OPERATION TO GET YOUR STRUCTURAL STEEL FABRICATED AND ERECTED

Plants: CLINTON BRIDGE WORKS, Clinton, Iowa • GAGE STRUCTURAL STEEL CO., Chicago, Ill.
MIDLAND STRUCTURAL STEEL CO., Cicero, Ill.

ALLIED STRUCTURAL STEEL COMPANIES
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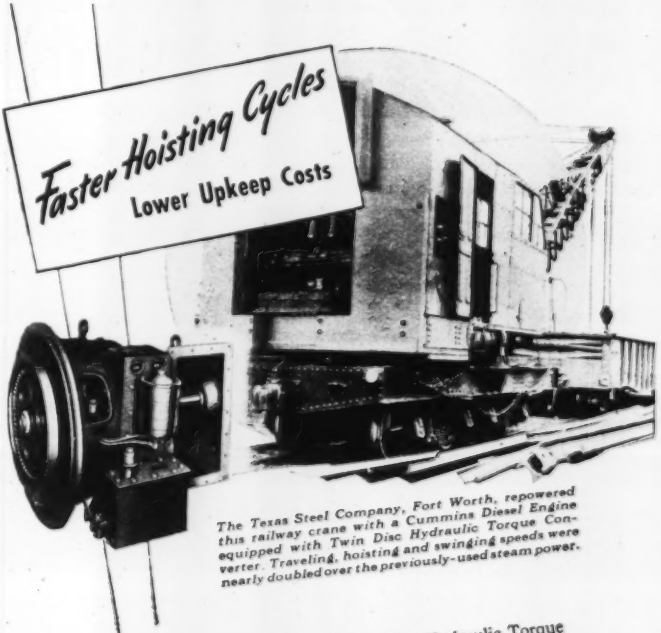
20 N. WACKER DRIVE CHICAGO 6, ILL.

. . . During 1948 Reynolds Metals Co. added 26 new distributors in the Aluminum division.

Personalities—Stephen W. Benedict is director of research of The Master Builders Co., Cleveland, Ohio . . . Wm. Seymour Jr., has been made vice-president; C. L. Hardy, assistant vice-president; and Thos. G. Miller, secretary of Joseph T. Ryerson & Son, Inc., Chicago steel distributors . . . Roland Vokac is now with Husky Refining Co. of Cody, Wyo., in a consulting and advisory capacity, partly to assist in the development of industrial asphalts . . . Arthur G. Lohse is vice-president in charge of the New York office at 120 Liberty St., of Iron & Steel Products, Inc. of Chicago. He will be assisted by Arthur D. Huff . . . Geo. B. Hoen has been named vice-president of the Wheeler Insulated Wire Co. of Bridgeport, Conn., and Geo. T. Mumaw, secretary and treasurer . . . A. H. Lundius has been appointed plant manager of the Hyatt Clark Township plant of the Hyatt Bearings division of General Motors Corp. near Harrison, N. J. . . . C. S. Gotwals is quality manager of all SKF Industries . . . Maynard B. Terry is vice-president of the American Brakelok division of the American Brake Shoe Co. . . . Thos. F. O'Neil of Boston, Mass., and Dan A. Kimball, Pasadena, Calif., have been appointed directors of The General Tire & Rubber Co. . . . R. E. Whinrey is assistant general manager of the Link-Belt Dodge plant in Indianapolis, Ind., and L. C. Heinlein, superintendent . . . Emil Schaeffer is chief engineer of the Tower division of the Elizabeth Iron Works, Inc., Elizabeth, N. J. . . . Robert M. Arnold, a director of Allegheny Ludlum Steel Corp. has been appointed a vice-president. He is also president of Arnold Engineering Co., Chicago, a wholly owned subsidiary . . . Frank O. Lincoln has been elected chairman of the board of the Hy-Pro Tool Co., New Bedford, Mass. . . . Three additional assistant divisional parts managers have been appointed by General Parts Manager M. T. Deames of Caterpillar Tractor Co., Peoria, Ill. They are T. A. Dunne in the Eastern Division, J. E. Ferguson in the Central Division, and W. R. Owens in the Western Division. Mr. Dunne will serve with Eastern Division Manager B. J. Grimm and assistant J. F. Heschong; Mr. Ferguson with Central Division Manager Thomas H. Hodgin and assistant C. F. Cummings; and Mr. Owens with Western Division Manager Herman F. Haven and assistant W. E. Doersam . . . Bernard H. McGuiness, for three years works



The Texas Steel Company, Fort Worth, repowered this railway crane with a Cummins Diesel Engine equipped with Twin Disc Hydraulic Torque Converter. Traveling, hoisting and swinging speeds were nearly doubled over the previously-used steam power.

Cranes equipped with Twin Disc Hydraulic Torque Converters provide the operator with a wide selection of speeds and torques for various operations of the hoisting cycle during spot or hook work. These Twin Disc units are designed for use wherever it is necessary to multiply torque for constantly-changing speed and load requirements.

Continuous smooth operation in starting, hoisting, and lowering also is assured with a Twin Disc Hydraulic Torque Converter. There is uninterrupted acceleration . . . less operator fatigue. Hoisting time is reduced because the operator is always lifting at the maximum speed for any given load.

Upkeep costs are lowered because the hydraulic nature of the drive protects the engine from destructive shock loads . . . dampens out engine torsional vibrations.

Twin Disc Hydraulic Torque Converters and Hydraulic Couplings have been proved in a wide variety of applications . . . cranes, hoists, tractors, yarders, loaders and locomotives. Write the Hydraulic Division for Bulletin No. 135-B (Torque Converter) and Bulletin No. 136 (Hydraulic Coupling). Twin Disc Clutch Company, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

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For KNOW-HOW • ENGINEERING • SUPERVISION • EQUIPMENT • to keep jobs DRY

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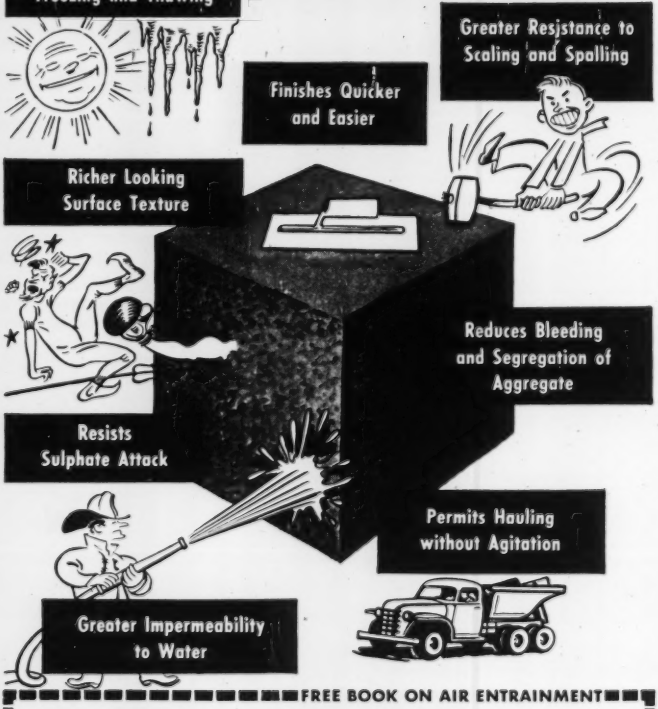
Get ALL the Advantages of Air-entraining with PROTEX


Resists Cracking Due to Freezing and Thawing
Greater Resistance to Scaling and Spalling
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FOR LOWER FINISHED COST PER YARD OF CONCRETE . . . USE PROTEX AEA

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Industrial & Research Division, Denver 9, Colorado
Please send me your book, "Facts on Modern Placement of Concrete Through Air Entrainment."
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manager of the Passaic, N. J., plant of HEWITT-ROBINS INC., materials-handling machinery manufacturers, has been appointed vice-president of the company's ROBINS CONVEYORS division . . . J. G. West has been named vice-president and manager of the Indiana Division of the LONE STAR CEMENT CORP., with headquarters in Indianapolis, succeeding George E. Pierson . . . John C. Keplinger has been promoted from vice-president in charge of sales of HERCULES MOTORS CORP., Canton, Ohio, to executive vice-president . . . Jay E. Jellick, has been appointed manager of the San Francisco headquarters of the PORTLAND CEMENT INFORMATION BUREAU, succeeding the late Ralph Rader. Returning to his old post after spending the last five years as sales manager of PACIFIC PORTLAND CEMENT CO., Jellick previously served as district engineer and manager of the Pacific Coast offices of the PORTLAND CEMENT ASSOCIATION . . . KENNAMETAL, INC., Latrobe, Pa., manufacturers of cemented carbide tools, announces appointment of Robert Hutchinson as an application engineer in the central district, headquarters in the Cleveland office at 860 Hanna Bldg. . . . GAR WOOD INDUSTRIES, INC., announces the appointment of W. F. Keeton as manager of its Los Angeles Branch . . . Paul Bremer and Wendell R. Holt have been appointed assistant vice-presidents of DURISOL, INC., manufacturers of building materials . . . Election of George J. Neumann of Allentown, Pa., as a vice-president and of Leo I. Bruce of New York as secretary has been announced by LEHIGH STRUCTURAL STEEL CO.

Deceased—Turner M. Porterfield, vice-president of the C. G. KERSHAM CONTRACTING CO., Birmingham, Ala., and president of the COLUMBUS, MISS., GRAVEL CO., died Dec. 29 . . . David T. Buffington Jr., 56, retired executive of the CARNEGIE-ILLINOIS STEEL CORP., Chicago, died Dec. 19.

Miscellany—Steel capacity at AMERICAN STEEL & WIRE CO.'s Duluth, Minn. works, will be increased 35 percent a year . . . A voluntary retirement income plan to which members of the KOHLER CO. organization with five years of continuous service are eligible has gone into effect at Kohler, Wis. This company recently celebrated its 75th anniversary and had a Christmas party for 550 members of its "quarter century club" . . . Announcement of the change of company name to WRIGHT MANUFACTURING CO., and the appointment of Bertram R. Scheff as its general sales manager, has been made by Thomas F. Millane, president of TAYLOR MANUFACTURING CO., Milwaukee, Wis. . . . In December

Follow the lead of the leaders

Take a look at the excavating industry. Notice how consistently the leaders are Bucyrus-Erie equipped.

One reason they're leaders is that they recognize good equipment. They know it pays to choose machines that deliver steady high production . . . machines that stay on the job and out of the shop.

So follow the lead of the leaders. You'll find that for sustained output in rock or dirt your best buy is Bucyrus!

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WYTEFACE "A"
TRADE MARK
STEEL MEASURING TAPES

The man who knows and uses measuring tapes instantly recognizes the superiority of WYTEFACE "A" Steel Tapes. Raised black graduations and rims, on a crack-proof white surface, make these steel tapes as easy to read in the brightest glare as in the dimmest light. See WYTEFACE "A" heavy duty and general purpose steel tapes at your dealer's, or write for catalogue.

WYTEFACE Steel Tapes and Tape Rules are protected by U. S. Patent 2,089,209.

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EST. 1867
NEW YORK • HOBOKEN, N. J.
CHICAGO • DETROIT • ST. LOUIS
SAN FRANCISCO • LOS ANGELES • MONTREAL

42 factory representatives from the U. S. and Canada visited the headquarters of the BARNES MFG. Co. at Mansfield, Ohio . . . RAYBESTOS-MANHATTAN, INC., has a new Seattle, Wash., warehouse and office at 314 Occidental Ave. . . . A branch office at 202 Plymouth Bldg., 2036 E. 22d St., Cleveland, Ohio, has been opened by KINNEY MFG. CO., Boston, Mass., liquid pumps, vacuum pumps, clutches and bituminous distributors . . . The return to the American market of BIRMINGHAM GUILD, LTD., architectural bronze designers and craftsmen of Birmingham, England, is announced coincidentally with the installation of a permanent display at ARCHITECTS SAMPLE CORP., 101 Park Avenue, New York, and the appointment of Fred L. Stuart, 33 West 42d Street, as American representative . . . A new building to house the Los Angeles area retail sales and service organization for HYSTER industrial trucks is being opened at 5301 Pacific Blvd., Huntington Park . . . Starting this year, the LEHIGH STRUCTURAL STEEL CO., Allentown, Pa., will award a $1,000 annual scholarship open to sons of employes. It will pay the expenses of the winner for his first year at Cincinnati University . . . The name of the SOUTHERN STEEL WORKS CO., Birmingham, Ala., has been changed to O'NEAL STEEL WORKS CO. . . . ALL-STATE WELDING ALLOYS CO., INC., has occupied its new headquarters building at 273 Ferris Ave., White Plains, N. Y. . . . CATERPILLAR TRACTOR CO. has opened a new $250,000 parts depot at Albany, N. Y. . . . THE RHEEM MFG. CO. of Richmond, Calif., has closed its Birmingham, Ala., plant . . . CAGNEGIE-ILLINOIS STEEL CORP. and AMERICAN STEEL AND WIRE CO. subsidiaries of United States Steel, have announced reductions in the extras for several of their stainless steel products. The reduction averages 5 percent.

Coldwell made president of Ford, Bacon & Davis

Everett S. Coldwell has been named president of Ford, Bacon & Davis, Inc., engineers, of New York, succeeding James F. Towers who remains as chairman of the board of directors.

Mr. Coldwell joined the firm in 1926 and directed phases of work at the Arkansas ordnance plant and the Oak Ridge project during the war. He was made executive vice-president in 1947. An M.I.T. man with graduate degrees from both Harvard and M.I.T., he also succeeds Mr. Towers as president of Ford, Bacon & Davis Construction Corp. of Monroe, La.

When you need specific information on materials, equipment or services, reach for your Sweet's File, Engineering (the big blue file). It contains 345 manufacturers' catalogs full of useful information on thousands of products . . . from absorbers—gas, to zinc galvanizing. Cross indexing speeds finding.

If Sweet's File, Engineering, is not available in your office, make request immediately for application form. Files are distributed FREE to qualified organizations and individuals.

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Men and Jobs

Foreign employees who are bringing an international atmosphere to the staff of Gannett, Fleming, Corddry and Carpenter, consulting engineers, of Harrisburg, Pa., include: **George Tricoglou**, from Greece; **Chung Y Li**, Cornell graduate from China; **Ali Gokyigit**, University of Michigan from Turkey; **Miguel Kawas** of Lebanon and **Matti Kassir** from Iraq, both graduates of the University of Michigan; and **Isaac Rida**, **Sigmund Danowski** and **Donald Dvorak**, all from Trans-Jordan, Arabia.

John F. Hall has been named district engineer in charge of the New York office of the Portland Cement Association, succeeding E. M. Fleming, who retired Nov. 1, after 22 years. He will direct field promotion in Connecticut, New Jersey and New York under the supervision of Regional Manager M. J. McMillan. Mr. Hall was graduated from Kansas State College as a civil engineer and joined the association in 1946, serving as a field engineer in New York State. Previously he held city and county engineering positions and was with consulting engineers. He served 26 months in World War 2 and retired with the rank of major.

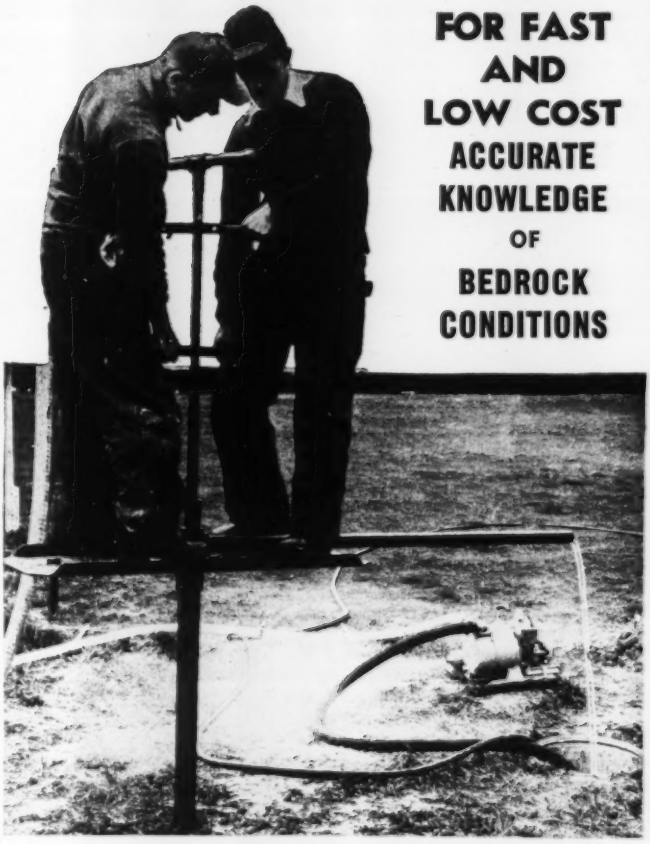
J. C. Scollin has resigned as city engineer of Mitchell, S. D., to go to Rapid City as administration assistant in the office of U. S. Purchasing and Disbursement.

George C. Hargrove and **Ralph D. Waterman** were recently elected vice-presidents of E. B. Badger & Sons Co., of Boston, Mass. Mr. Hargrove, with the firm 18 years, is in charge of general administration and sales. Mr. Waterman, with the firm nine years, is in charge of engineering and construction.

Two Ventura, Calif., building officials, **V. M. Capesius**, city engineer, and **Donald Knight**, building inspector, have submitted resignations to the city council, announcing plans to go into business for themselves.

Vincent K. Cates, manager of the Logan International Airport at East Boston, Mass., has resigned to take a civilian post in the Civil Engineers Corps of the U. S. Navy.

J. S. Minotte has been transferred from resident engineer of the U. S. Engineers, Olean, N. Y., Flood Pro-



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Empire HYDRAULIC TESTING DRILL

When you drill to bedrock you want to know your subsurface conditions—but at LOW COST. Here is the rig that you can transport and set up easily and economically in rough country, with a couple of men if necessary. Designed especially for this class of work. Extensively used by U. S. and State Governments and many others. Extremely strong and simple.

Easy to transport, setup, take down

JUST THE DRILL FOR ROUGH COUNTRY

Outfit weighs only a total of 800 lbs. for 50 ft. drilling depths. Gives accurate samples of materials drilled. Every part can be handled by one or two men. Send for descriptive circular giving complete specifications. It will help if you advise us regarding drilling depths and general nature of work.

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75 WEST ST., NEW YORK, N. Y.
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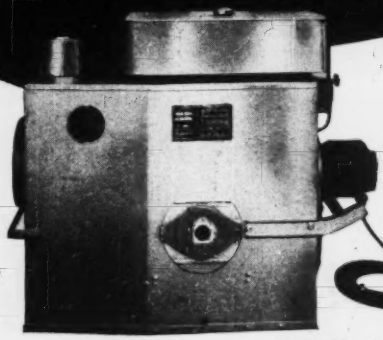
New LOW COST PORTABLE HEAT
FOR YOUR SMALLER JOBS



THE NEW HERMAN NELSON

Economy Model Portable Heater

- **Provides Quick, Clean, Safe Heat — *without* smoke, soot, fumes or open flame!**
- **Abundant *fresh*, heated air — *forced* to areas where most needed!**

Burns range oil, kerosene or prime white distillate—costs but 19c per hour!

125,000 BTU per hour capacity—enough to heat almost two ordinary 5-room houses.

Electric motor powered; 115-230 volt, 60 cycle, single phase.

One 12" dia. x 12' long, extendable hot air duct.

Small, compact, light weight.

LOW PRICED FOR SMALLER JOBS!

Write for Interesting Free Booklet on "Cost Control"

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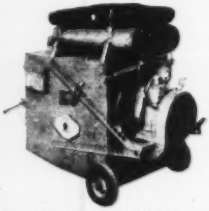

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SINCE 1906 MANUFACTURERS OF QUALITY HEATING AND VENTILATING PRODUCTS

DRILLING CONTRACTORS

DIAMOND AND SHOT CORE BORINGS — DRY SAMPLE BORINGS

Foundation Testing for Bridges, Dams and all Heavy Structures

Also

Manufacturers of Diamond and Shot Core Drills, Accessories and Equipment

SPRAGUE & HENWOOD, Inc.

Scranton, Pa. Dept. E, U. S. A.

Hayward Buckets

Use this Class "E" Clam Shell Bucket for handling crushed stone, gravel, sand and other bulk materials.

THE HAYWARD CO., 48-50 Church St., N. Y. 7

tection Project, to be assistant chief of the construction division and head of the project control branch in the Pittsburgh district office. He is succeeded at Olean by Alfred Goellner, formerly assistant resident engineer.

W. L. Gates, Jr., has been appointed city engineer of Clarksdale, Miss. He received his degree in engineering at Georgia Tech in 1935.

Maj. Gen. Robert W. Crawford, president of the Mississippi River Commission, is resigning to be executive vice-president of the Mississippi Valley Flood Control Association when his Army retirement is approved. General Crawford has had 34 years of Army service and has been president of the Mississippi River Commission since late 1945.

Lester Hagerbaumer of the Tulsa, Okla., district office, Corps of Engineers, has been appointed resident engineer for the Bonham VA hospital project, Bonham, Tex. He has served the Corps of Engineers for 14 years.

E. J. Niemen, resident engineer for the Bureau of Reclamation on the Main Canal of the Columbia Basin Project, has been named resident engineer for the Soap Lake Siphon. A graduate of the University of Washington, he joined the bureau in 1933 as associate engineer in charge of field engineering for the west end of the Grand Coulee Dam, including the west powerhouse. He had formerly spent eight years with the city of Tacoma in construction of Cushman Dam. Since his return from duty with the Corps of Engineers, he has been working on the main Canal, Bacon Siphon and Bacon Tunnel near Coulee City.

At the age of 70, with 47 years of service with the United States Corps of Engineers, **David M. Brock** of Memphis, Tenn., has retired. He received his degree in engineering from the University of Kentucky in 1900. He started as a rodman on levee surveys. He leaves as chief of the water transportation branch. He will be succeeded by Harold J. Baker, who has been his assistant for two years.

Four appointments as assistant district engineer in the Syracuse, Rochester, Utica and Binghamton district offices of the N. Y. State Department of Public Works are announced: **Joseph C. Federick** will fill the position in the Syracuse Office recently vacated by **Andrew R. Mulligan**, promoted to district engineer at Rochester. Mr. Federick, who is a graduate

Welded Steel Framework Cuts Cost 50%

By Francis J. Schroedel, President
Schroedel Construction Company, Milwaukee, Wisconsin

DIRECT savings of 50% over masonry and fire resistive construction are being realized in the erection of four 12-family apartment units, eight 16-family units and one 24-family apartment for the Estabrook project in Shorewood, Wisconsin. These savings result from greatly simplified construction methods using steel members for wall frame and floor joists and are made possible by arc welding.

A modular design using 2-foot increments enables mass production arc welding techniques for fast, low-cost shop fabrication of wall panel members for the first and second floors. Bethlehem open-web expanded-steel studs are welded between a channel cap or girt and a sill plate for both the first and second floor panels. Three-quarter inch channel is added between the studs for horizontal bracing.

During field erection, the wall panels are raised into position, held in place with a simple clamp (Fig. 1) and arc welded with $\frac{5}{32}$" diameter "Fleetweld 5" electrode, using 200-amp. engine-driven Lincoln "Shield-Arc" welders. The first floor framing is welded into an integral unit, and a finished concrete floor is later poured to cover the sill plates thus anchoring the building frame in position.

An "I" beam, supported by two outside walls and the center utility room walls, forms the center support for the expanded steel second floor framework. The erection of the second floor panels is then done without the need for any scaffolding.

Exterior walls are finished with masonry, and interior plastering is applied to metal lath. In addition to direct cost savings in the building erection, additional benefits are easier, less costly installation of plumbing, wiring and insulation. The structure is both shrinkproof and verminproof.

Fig. 1. Arc welding steel panels to form the side walls. Panels are made from 4" Bethlehem expanded steel studs.

Fig. 2. Placing second floor prefabricated steel wall panels in position. Panels are hoisted and welded in place without use of any scaffolding.

Fig. 3. Framework for one of many multiple family apartments built with all-welded steel construction. The Estabrook Homes project is located in Shorewood, Milwaukee, Wisconsin.

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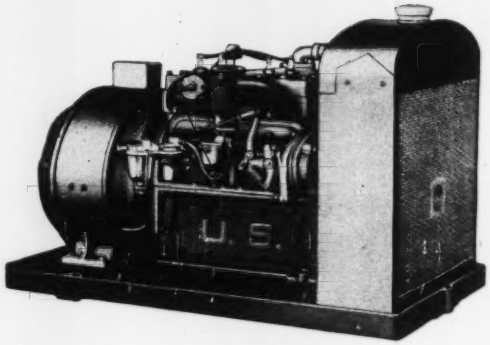

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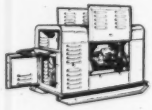

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of Rensselaer Polytechnic Institute and of Syracuse University, joined the Buffalo district office in 1927. He is a veteran of World War II from which he returned to the department's division of engineering at Albany.

Henry TenHagen, who has been acting assistant district engineer in the Rochester district, will continue to serve there. A graduate of Cornell University, he entered state service in 1913. He is a veteran of World War I.

John P. Larsen, assigned to the Utica office, has been there provisionally since December, 1946. He is a graduate of Syracuse University, entered state service in 1915 at the Buffalo office, and has been in the district offices at Albany, Rochester and Utica. He is a veteran of both wars.

Ray W. Garrett has been appointed city engineer of London, Ont., replacing Col. W. M. Leitch, resigned.

Floyd S. Arnold, Bureau of Reclamation engineer since 1935, has been named construction engineer for the Columbia Basin Project's Irrigation Division in eastern Washington, with headquarters at Ephrata. Formerly resident engineer on the West and East Low canals, Arnold now will direct all construction south of Coulee City. A graduate of Washington State College, Arnold was an associate engineer in the building of the Grand Coulee Dam. Before joining the Bureau he was with contracting firms and counties in highway building in eastern Washington. He entered the Corps of Engineers as a colonel in 1942, engaging in military construction in England, France and Germany.

Lieut. Col. William I. English has resigned as resident engineer in charge of construction of the Veterans Hospital in Buffalo, N. Y., to go with a textile concern in Greensboro, N. C. He is succeeded by **Elmer H. Gruenwald** recently engineer for the Syracuse area. Colonel English joined the Buffalo staff in January, 1946, in the construction division. Afterward he was made executive officer to Col. Herbert D. Vogel, chief of the Buffalo District Office of the U. S. Corps of Engineers, serving as such until he became resident engineer last January.

E. C. Mathews of Moncton, N. B., has been appointed division engineer of the Canadian National Railroad at Edmundston, N. B.

Charles Bruce, for the last nine years chief engineer of the Canadian Fisheries Department, has retired after 36 years with the department.

The resignation of **Raymond W. McCall,** resident engineer, Center Hill Project, has been announced by Col. H. V. Canan, district engineer, Nashville District, Corps of Engineers. McCall, who has completed 20 years service with the Corps of Engineers, was first assigned to the Panama Canal Commission. He later served with the Pittsburgh district in the construction of Tigart and Mahoning dams and Lock and Dam No. 9. He joined the Nashville district in 1940 and was assigned as assistant resident engineer at the Center Hill project. When work was suspended on this dam in 1942, McCall entered military service. After various assignments in the states, he was transferred to the C.B.I. Theater as a captain, his assignments being mostly on the construction of the Lido Road. After the war he returned to the Center Hill Project He will be succeeded by **H. B. Elder,** resident engineer, Dale Hollow Project. McCall will be with the Ralph E. Mills Co. and Gorman Bros. Co. as project manager at Buggs Island Dam.

John F. Fitzgerald, who was replaced as a member of the Port of Boston Authority by Col. Alexander Macomber, a consulting engineer, has been appointed to serve the commissioners as a special consultant. Mr. Fitzgerald was a member of the authority for 15 years and is a former mayor of Boston.

Wendell R. LaDue, superintendent and chief engineer of the Akron, Ohio, Water Department, in the last 28 years has instigated the planting of more than $3,000,000 worth of trees, especially near the city's supply of water at Lake Rockwell, north of Akron.

Desso T. Mitchell, Columbus, Ohio, has been named Franklin County sanitary engineer there, to succeed **Grover T. Clements,** who resigned to become director of the county planning commission.

James L. Gillis, of Soperton, Ga., has been appointed state highway director, succeeding John C. Beasley. Mr. Gillis has appointed four highway department career men to the top engineering posts, all of whom have had more than 20 years' service with the department. They are: **M. L. Shadburn,** chief engineer; **C. Blake Smith,** chief maintenance engineer; **George T. McDonald,** engineer in charge of post roads, and **Charles W. Lefwich,** engineer in charge of construction. Mr. Shadburn twice before has held the post of chief engineer, and Mr. McDonald is a former director-chief engineer of the department.

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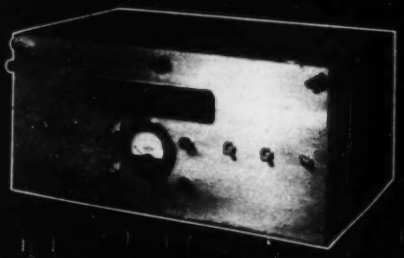

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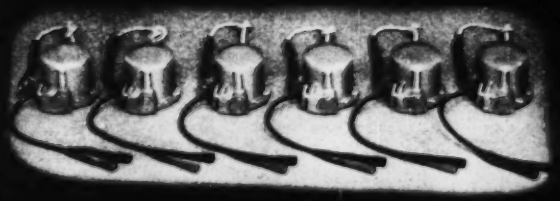

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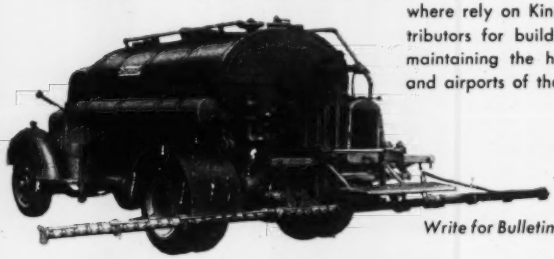

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Elections and Activities

These candidates have been nominated by the Building Contractors Association of Indianapolis, Ind., Charles E. Nourse, of Foster Engineering Co., for president; Francis A. Wilhelm, for first vice-president; Arthur E. Vehling, for second vice-president; and Ralph Iula, for secretary-treasurer.

Central Ohio Section, (Columbus) American Society of Civil Engineers, has installed the following officers for 1949: President, Clarence D. Bowser; first vice-president, J. F. Barbee; second vice-president, Howard E. Bonham; secretary-treasurer, Emmett H. Karrer.

George Hallenbeck, president of Hallenbeck Testing Laboratory, Buffalo, has been elected president of the Building Industry Employers of New York State. Other officers: vice-president, H. M. Hughes of the Hughes Construction Co., New York; and executive secretary-treasurer, William Picard, Albany, re-elected. Frank W. O'Connell, Binghamton contractor, was named chairman of the past presidents' advisory committee.

Newly-elected president of the Montana section, American Society of Civil Engineers, is John Morrison of Helena. He will succeed Fred Thieme of Missoula. Other officers are John D. Officer of Columbus Falls, first vice-president; Harold Egeberg of Great Falls, second vice-president, and Louis Henke, Jr., of Helena, secretary-treasurer. The society will hold its 1949 convention near Hungry Horse Dam next September

Newly-elected officers of the American Society of Civil Engineers, Mid-South Section, are headed by W. R. Spencer, head of the University of Arkansas College of Engineering, civil engineering department. Others elected: W. J. Turnbull, Vicksburg, Miss., head of the Waterways Experiment Station, vice-president; F. E. Mitchell, U. of A. College of Engineering, secretary-treasurer, and Leonard White, Little Rock, director. Also named director was Sydney Chandler, Jackson, Miss.

The Madison County Chapter, Illinois Society of Professional Engineers, has elected the following officers for 1949: J. D. Voorhees, president; W. E. Willis, vice-president; C. C. Bloom, secretary-treasurer; K. B.

THIS JOB ON A BUSY STREET CALLED FOR THE PUMP THAT STAYS BUSY!

North Fourth Street in Milwaukee, Wisconsin, is a busy thoroughfare, especially the block between West Michigan Street and Wisconsin Avenue. To lay a new, larger sanitary sewer on this heart-of-the-city job, contractor Otto P. Seefeld had to have equipment that would keep busy without fail.

In the illustration, two Marlow Self-Priming Centrifugal Pumps (a 4-inch 40M and a 3 -inch 20M) are shown by-passing sewage as the construction of the new line progresses. In this service these pumps were called on to pump continuously. Large business buildings in the area and a Y.M.C.A. building across the street were depending on them.

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Grigsby, E. J. Wade and G. Shanahan, executive committee and C. F. Abraham, chapter representative, whose term continues through 1949.

A. E. Johnson, chief engineer of the Arkansas State Highway Department, has been elected president of the Southeastern Association of State Highway Officials. He succeeds W. G. Pruett, office engineer for the Alabama Highway Department. Mr. Johnson has been serving as vice-president. S. T. Roebuck, Jackson, chairman of the Mississippi Highway Commission, was elected vice-president. Mr. Johnson will appoint the secretary-treasurer. M. L. O'Neale, Charleston, W. Va., was named chairman of the administration committee.

Northeastern Indiana Association on Soil Conservation has been created by soil conservation district supervisors in Allen, Noble, DeKalb, and Elkhart counties to handle conservation projects too large for a single district to cover. Carlos Palmer, Noble County, has been elected chairman; Russell House, DeKalb, vice-chairman; Glen Bowman, Elkhart, secretary; and Carl Dickes, Allen, treasurer.

James W. Morgan, Birmingham, Ala., Commissioner of Public Improvements, has been re-elected president of the Southern Building Code Congress.

Dean A. A. Potter, of Purdue University's engineering schools, was named "Engineer of the Year in Indiana" at the December convention of the Indiana Society of Professional Engineers. Maj. Gen. Joseph Cowles Mehaffey, former governor of the Panama Canal Zone, addressed the group on behalf of the United States Army Engineers. He succeeded Maj. Gen. Douglas L. Weart as Ohio River division engineer at Cincinnati, following his tour in Panama, which ended in May, 1944.

OBITUARY

William J. Sullivan, 76, retired chief engineer of the Boston, Mass., street layout department, died Dec. 31. Until his retirement in 1941 he supervised the remodeling of Dock Square, Cummins Highway, Causeway, Nashua and Charles streets, and others. He also supervised the city's part in the construction of South Station.

William B. Miller, 55, Cleveland, Ohio, structural engineer, died Dec. 30. For a time he worked for the Cleveland Board of Education as structural engineer. Later he was connected with Walker & Weeks, architects and engineers. In 1945 he went into business for himself. He held patents on many structural devices. He was an engineering graduate of Lehigh University.

James R. Wood, 60, city engineer of Calgary, Alta., died Dec. 31.

Stuart A. Beach, 43, specialist in tunnel inspection work for the Metropolitan District Commission, Massachusetts, died Dec. 31. He had been connected with the commission for 20 years during which he was engaged in supervision of work on Boston water supply tunnels.

Frederic Carr Knight, 62, valuation engineer for the Canadian National Railways, died Dec. 30. He was graduated in civil engineering from Dalhousie University and later obtained a Master of Science degree from McGill University.

Tolley A. Biays, 72, a civil engineer for many years attached to the Maryland State Board of Health, died in Baltimore recently.

Frank H. Mason, 69, chief engineer of the New England Public Service Co., for more than 40 years, died at Augusta, Me., recently. He got his technical education at Massachusetts Institute of Technology and Rensselaer Polytechnic Institute. In 1906 he went to Maine and started with the Bar Harbor and Union River Water Power Co., at Ellsworth. In his career Mr. Mason had supervised the construction of more than 30 power stations in Northern New England.

Lot D. Jones, 71, Delaware County engineer, died Dec. 29 in Delaware, Ohio. He was with the Ohio Highway Department for 23 years, and served seven years in Morrow County as engineer and deputy engineer.

Stirling E. McCullough, 50, vice-president of Brown & Root, Inc., a construction firm of Houston, Tex., died there on Jan. 1. He supervised the construction of many large projects, including the U. S. Navy ammunition depot at McAlester, Lake Waco at Waco, the Army Ordnance Depot at Texarkana, and many large Navy and Army construction projects in World War II.

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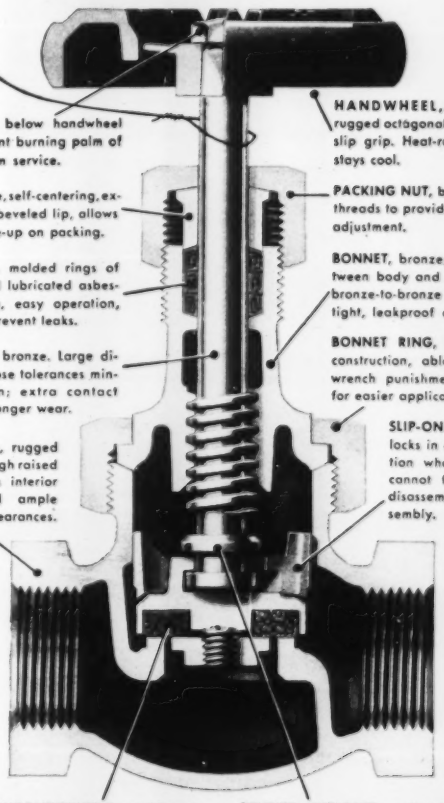

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WATER SUPPLY

N. C., Thomasville—City, voted bonds water facilities, **$200,000.**

Tex., Baytown—City, WW expans. **$250,000.** Joe J. Rady, 811 Insurance Bldg., Fort Worth, consult. engr.

●**Tex., Denison**—City, bond election Jan. 31, water sys. rehabilitation and addnl. distr. lines, **$728,000;** water storage and supply, **$500,000.** T. C. Forrest, Jr., Praetorian Bldg., Dallas, consult. engr. CD 11/18—ENR 12/9.

Tex., Levelland—City, Ray Watson, mayor, WW sys. expans., imprvs. **$200,000.** Joe Ward, 545 Nacol Bldg., Wichita Falls, consult. engr. CD 7/26—ENR 8/5.

Tex., Littlefield—City, WW sys. extens., imprvs. **$250,000.** Joe E. Ward, Nacol Bldg., Wichita Falls, consult. engr.

●**Tex., Port Arthur**—City, defeated bonds, addnl. watermains and sys. imprvs. **$1,000,000;** reservoir pumping station, **$600,000;** water filtration plant, **$1,000,000.** M. D. Gates, city engr. CD 12/2.

Wyo., Lander — City, WW sys. imprvs. **$330,200.**

SEWERS, WASTE DISPOSAL

Calif., Concord—City, City Hall, **$460,000,** bond election Feb. 1, sewage disposal plant. John S. Bates, 3134 Eton Ave., Berkeley, consult. engr.

Calif., Los Angeles—City, 6.82 mi. 18 in. clay intercepter sewer Hallona Creek in Los Angeles-Venice. **$500,000.** Lloyd Aldrich, city engr.

Calif., San Jose—Santa Clara Co. Sanitation Dist. 2, Courthouse, approved **$650,000** bonds trunk sewers, near here. Mark Thomas & Co., 18 N. San Pedro St., consult engrs. CD 4/27/44—ENR 5/18/44.

Calif., Santa Rosa—City, City Hall, sewage treatment plant. **$500,000.** Brown & Caldwell, 232 Sansome St., San Francisco, consult engrs. Frank R. Sarles, city engr. CD 12/11/45—ENR 1/3/46.

Mass., Framingham—Town, Comr. P. Wks., sewage pump. station, Lakeville Station, **$100,000.** Haley & Ward, 73 Tremont St., Boston, engrs.

Mich., Lincoln Park—City, City Hall, trunk relief sewers, pump. station, **$750,000.** Pate I. Hirn, 532 Michigan Bldg., Detroit, consult. archt. Edwin H. Pate, city engr. CD 9/28/44—ENR 10/19/44.

Mo., Cape Girardeau—City, City Hall, 1,800 ft. 15 in. trunk sewers and 7,000 ft. laterals in Marble City Heights Dist. and 5,200 ft. 10 in. and 12 in. trunk sewers; 25,000 ft. laterals in Monticello Addn. Over **$100,000.** John R. Walther, city engr.

Okla., Shawnee—City, E. E. Jones, mgr., sewage disposal plant, **$185,000.** C. H. Guernsey & Co., 1414 N. Robinson St., Oklahoma City, consult. engrs. CD 4/11/46—ENR 5/5/46.

Okla., Stillwater—City, voted bonds sewage disposal plant extens, **$50,000,** C. H. Guernsey Co., 1414 N. Robinson St., Oklahoma City, consult. engr.; sanitary sewer extens., **$78,000,** George Handelsman, city engr.

Pa., Enola Boro—Pennsylvania R. R. Co., J. L. Gressitt, ch. engr., Broad St. Station Bldg., 1617 Pennsylvania Blvd., Phila., industrial waste treatment plant at Enola Yards of Pennsylvania R. R. Gannett, Fleming, Corddry & Carpenter, 600 N. 2 St., Harrisburg, consult. engrs.

●**Pa., Scranton**—City, City Hall, intercepting sewer, sewerage sys. addns., incl. primary and secondary sewage treatment plants, pump. stations, etc. **$7,842,600.** Gannett, Fleming, Corddry & Carpenter, 600 N. 2 St., Harrisburg, engrs. CD 2/24/47—ENR 3/6/47.

Pa., West Newton—Weston Newton Boro, sewage treatment facilities. **$150,000.** Chester Engineers, 210 E. Parkway, N. S., Pittsburgh, engrs. CD 1/20/47—ENR 2/6/47.

●**Tex., Denison**—City, bond election Jan. 31, sanitary sewerage sys. rehabilitation and line extens. **$715,525;** sewerage disposal and treatment plant, **$450,000.** T. C. Forrest, Jr., Praetorian Bldg., Dallas, consult. engr. CD 11/18—ENR 12/9.

Tex., Angleton — City, sewage treatment plant, **$115,000.** Garrett Eng. Co., 1806 Milam St., Houston, consult. engr.

Tex., Baytown—City, sanitary sewerage sys. exten., imprv. **$300,000;** drainage, **$275,000.** Joe J. Rady, 811 Insurance Bldg., Forth Worth, consult. engr. CD 6/21—ENR 7/8.

Tex., Levelland—City, Ray Watson, mayor, sanitary sewerage sys. expans., imprvs. **$300,000.** Joe Ward, 545 Nacol Bldg., Wichita Falls, consult. engr. CD 7/26—ENR 8/5.

Tex., Littlefield—City, sanitary sewerage sys., extens., imprvs. **$200,000.** Joe E. Ward, Nacol Bldg., Wichita Falls, consult. engr.

Tex., Marlin—City, E. M. Dodson, mayor, sanitary sewerage sys. extens., imprvs. **$175,000.** H. R. F. Helland, Frost Natl. Bank Bldg., San Antonio, consult. engr.

●**Tex., Port Arthur**—City, defeated bonds, addnl. sanitary sewer lines, sys. imprvs. **$1,200,000;** sewage disposal plant, **$1,200,000,** M. D. Gates, city engr.

Tex., San Antonio—City, 24 in. sanitary sewer main from Olmos Basin, connecting to airport main to Broadway at Breckenridge. **$550,000.** J. W. Beretta Engineers, Inc., 902 Travis Bldg., consult. engr. CD 12/15/47—ENR 12/25/47.

Wash., Ritzville—City, City Hall, sewage disposal plant, **$70,150;** 2 trunk lines, **$32,200.** W. L. Woodward, city engr.

BRIDGES

Calif., Los Angeles — Bd. Supervs., Los Angeles Co., 501 Hall of Records, 200 ft. Arrow Highway Bridge, **$250,000.** C. E. Arnold, co. engr. CD 12/6/45—ENR 1/3/46.

●**Connecticut**—State Hy. Dpt., C. Albert Hill, comr., Hartford.

Bolton—Overpass, approaches to carry U. S. Rt. 6 and Rt. 49 over railroad and b. conc. pavement, **$175,000.**

Cornwall—2-lane bit. relocation Rt. 63 from Cornwall Hollow to Goshen Town Line, **$80,000.**

Darien—bridge to carry Kings Highway over new 4-lane expressway, **$170,000.**

Derby—3-lane bridge for traffic to carry Main St. over railroad, **$250,000.**

Norwich-Franklin—railroad overpass U. S. Rt. 2 and Rt. 32 northerly to junction of conn. Rt. 87, railroad, River and Canal Bridges, 2-lane b. conc. pavement, **$600,000.**

Stafford—2-lane highway bridge over Willimantic River, 2-lane highway bridge over Middle River, bit. approaches, **$130,000,**

Washington—2-lane highway bridge over Shepaug River with bit. approaches, **$100,000,**

Waterbury—U. S. Rt. 6-A, bit. approaches to Waterbury expressway Union to Mill Sts., **$130,000;**

West Haven-New Haven — 4 lane highway bridge to carry U. S. Rt. 1 over West River at town line. **$150,000,**

Joseph D. Drury, state hy. engr.

Willimantic—446 ft. concrete, steel bridge, 63 ft. wide, Waterbury Expressway over Mad River, a spur track and part of Mill St., F. A. P. Proj., over **$50,000.**

Willington—2-lane bridges, 1 over railroad and other over Willimantic River in connection with highway relocation. **$300,000,**

Ill., Aurora—City, City Hall, voted **$175,000** bonds, bridge across Fix River at Illinois Ave., incl. abutments, approaches, piers, roadways, pavements, sidewalks, leading thereto and thereon, etc.

Ia., Denison—Crawford Co., bridge constr. **$102,000.**

La., Shreveport—City, City Hall, Allen-Dalzell-Linwood Overpass. **$750,000.** E. M. Freeman & Assoc., City Bank Bldg., consult. engrs.

Oklahoma—State Hy. Dpt., Oklahoma City.

Oklahoma Co.—Grade separation at N. W. 50 and Western Sts., for new urban road. Approx. **$100,000.** S. K. McClelland, c/o owner, engr.

Tenn., Nashville—Davidson Co., 2 bridges over Cumberland River, replace. Estimates **$350,000.** J. C. Akers, Courthouse, co. engr.

†**Alaska**—Pub. Roads Admin., Juneau, bridge over Kenai River, with 1.1 mi. approaches. **$200,000.**

Man., Winnipeg—Municipality, bridge over Red River, Disraeli St. Over **$100,000.** W. D. Hurst, city engr.

Ont., London—City Council, bylaw carried, 3 span steel, concrete bridge to replace Oxford St. Bridge, **$200,000.** Roy Garrett, city engr. M. M. Dillon, Bank of Toronto Chambers, structural engr. CD 9/22—ENR 10/28.

Ont., Vaudorf—Toronto Roads Comm., 57 E. Adelaide St., enlarging subway, Don Mills Rd. **$104,000.** H. C. Rose, 57 E. Adelaide St., engr.

Quebec — Province of Quebec, Quebec City.

Donnacona—Bridge across Jacques Cartier River, **$300,000.**

STREETS AND ROADS

Ariz., Phoenix—City, bit. surf., concrete curbing and gutters, sewerage draining, etc. **$104,000,** F. N. Holmquist, Security Bldg., consult. engr. R. Gail Baker, city engr. CD 2/1/46—ENR 2/21/46.

●**Connecticut**—State Hy. Dpt., G. Albert Hill, comr., Hartford.

Bristol—B. conc. U. S. Rt. 6 from N. Main St., to railroad crossing, **$15,000,**

Colchester-Salem—B. conc. Conn. 85, cut back banks near Prospect Hill Rd. and near town line, elimination of 2 curves, **$250,000,**

Cromwell—B. conc. shoulders U. S. Rt. 9 from junction of Conn. 18 north on truck lane, 2 sections, **$20,000,**

Danbury—Bit. U. S. Rt. 6 at New York State Line, make transition from 4-lane N. Y. Hy. to Conn. 2 lanes, **$5,000,**

East Haven—Resurf. Conn. 142 from Main St. to Short Beach Rd., **$75,000,**

Glastonbury—Grading, drainage from junction of Conn. Rt. 2 south to Conn. Rt. 17 near Hale House, 2 lanes, **$200,000,**

Groton—Bit. Conn. 84 to Ledyard town line, **$50,000,**

Kent—Drainage U. S. Rt. 7 at junction Conn. Rt. 341, **$30,000,**

Madison—Bit. Conn. 79, reconstr. 2 lane, north from 1947 work, **$180,000.**

Marlborough-Hebron—B. conc. U. S. Rt. 2 Blackledge River section, elimination curves, **$725,000,**

Middletown—C. conc. U. S. Rt. 9 from new location river front from Main St. extension north to Conn. 9 at Sebethe River, 4-lane divided hy., **$350,000,**

C. conc. Conn. 72 end of present pavement, continuing southerly 2-lane bi. conc., **$95,000,**

New Haven-Hamden—C. conc. 4-lane divided hy. from West Rock Tunnel to junction of Conn. 10, Wilbur Cross Parkway, **$350,000.**

North Canaan—Bit., bridge over railroad U. S. Rt. 7, S. St. 44 junction of Conn. 126, U. S. Rt. 44 to junction of Conn. 124 and U. S. Rt. 7, 2-lane, **$800,000.**

C. conc. U. S. Rt. 44 through East Canaan Village, 2-lane, **$80,000,**

Norwalk—C. conc. Conn. 7 interchange accelerating lane NW Quadrant of interchange, Merritt Parkway, **$6,000,**

Orange-Woodbridge-New Haven—C. conc. 4-lane parkway from junction of Conn. 34 to West Rock Tunnel, Wilbur Cross Parkway, **$520,000,**

Portland—C. conc. 4-lane hy. U. S. Rt. 6A and Conn. 17 from end of present 4-lane hy. easterly to junction of 2 Rts., **$275,000.**

Seymour—C. conc. Rank St. from 1934 to Conn. Rt. 8, 2 lane, **$200,000,**

Waterford-Montville—C. conc. 4-lane hy. Waterford to Trading Cove Brook, **$600,000,**

Watertown-Thomaston—B. conc. Conn. 109, 2 lane in section of State Forest north of Leadmine River, **$200,000.**

Westbrook-Old Saybrook—Grading, drainage, 4 lanes along right-of-way U. S. Rt. Conn. 153 in Westbrook north of railroad to west approach of Baldwin Bridge, **$1,000,000.**

Woodbridge—R. conc. shoulders for Truck Lane south of Rt. 63 and 67, **$55,000,**

Woodstock—Bit. 2 lane Conn. 91 relocation from western junction Conn. 93 easterly to Putnam town line, **$200,000,** R. E. Jorgensen, state engr.

North Carolina—State Hy. Dpt., Raleigh.

Dare Co.—Paving between Stumpy Point and Manns Harbour, **$200,000.**

Durham and Orange Counties—2 dual lane Durham Chapel Hill Rd., **$500,000.**

Haywood Co.—Roadway along course of Pigeon River Rd., **$150,000,**

Yancey and Mitchell Counties—Road through Red Hill and Green Mountain Sects., **$250,000.** W. V. Raise, hy. engr.

Okla., Enid—City, 26 blocks roads in Dist. 292, **$185,000.** V. G. Thompson, 1100 W. Main St., Oklahoma City, consult. engr.

Okla., Oklahoma City—City, paving Grand Blvd. from Western St. to May Ave. **$100,000.** H. E. Chase, city engr. CD 10/29/45—ENR 11/15/45.

Okla., Oklahoma City—Oklahoma Industries, Inc., First Natl. Bldg., c. conc. streets, **$140,000.** Lee M. Bush & Co., Colcord Bldg., consult. engr.

Tenn., Nashville—Davison Co., resurfac. 11 roads, **$150,000;** constructing 34 highways, **$117,000.** J. Clark Akers, co. hy. engr.

Tex., Angleton—City, asph. 5.6 mi. **$188,000.** Garrett Eng. Co., 1806 Milam St., Houston, consult. engr.

Tex., Corpus Christi—Nueces Co., c/o George Prause, Judge, Courthouse, voted bonds, road reconstruction, surfacing 28.53 mi. Precinct 1, **$185,000;** 52.84 mi. Precinct 2, **$320,000;** 67.8 mi. Precinct 3, **$320,000;** 65.57 mi. Precinct 4, **$425,000.** J. R. Laurence, co. engr. CD 12/1.

Tex., Cuero—City, bond election Jan. 17, street imprvs. and asph. **$100,000.** CD 10/18/45—ENR 11/1/45.

†**Alaska**—Pub. Roads Admin., Juneau, relocating 1.6 mi. Wards Cove sect. of Tongass Hy. **$100,000.** CD 8/17/45—ENR 9/6/45.

EARTHWORK, WATERWAYS

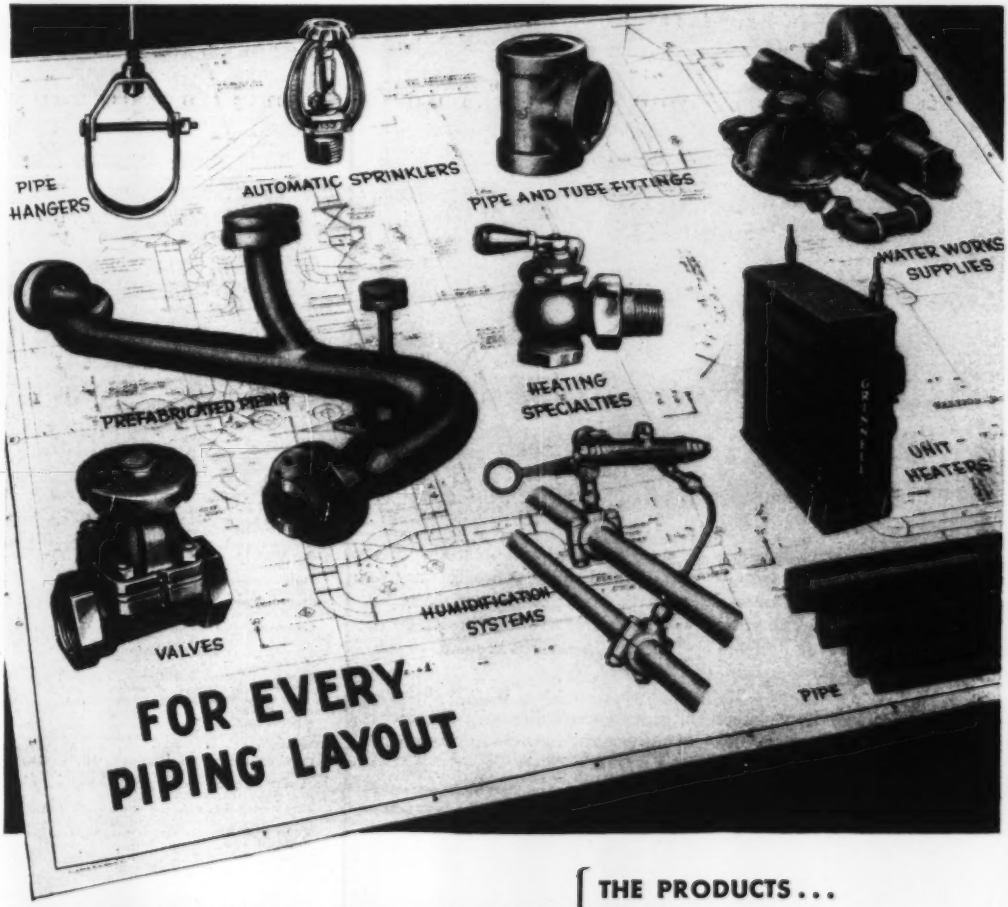
●†**Iowa** — U. S. Eng., Clock Tower Bldg., Rock Island, Ill., Red Rock Dam and Reservoir, Howell River Dam site above Boones River, near Pella, Marion Co. **$18,500,000.**

●**Pennsylvania**—Dpt. Forests & Waters, State Capitol, Harrisburg, flood control and recreation dam on Ricketts Creek, Ricketts Glen State Park, Luzerne Co. **$600,000;** on Carnahan Run, Westmoreland Co.; at Gaines, on Upper Big Pine Crk, Tioga Co. **$645,000.**

Tex., Galveston—Houston Yacht Club, c/o J. Fred Hayworth, Jr., 1921 Bolsvr., Houston, Yacht Club Harbor imprvs., incl. dredging basin, steel sheds to house 75 boats, bulkheads, etc. **$100,000.**

Tex., Houston—Harris County Agricultural Conservation Assn., c/o Claude C. Jennings, Courthouse Bldg., soil conservation and imprv. proj., drilling water wells, terracing, earthen water tanks, clearing, grubbing and drainage, etc. **$206,000.**

●†**Tex., Roma**—International Boundary & Water Comm., U. S. and Mexico, 1st Natl. Bank Bldg., El Paso, Falcon Dam on Rio Grande River (an irrigation and power proj.), sufficient for 600,000 acres land, (water stor-



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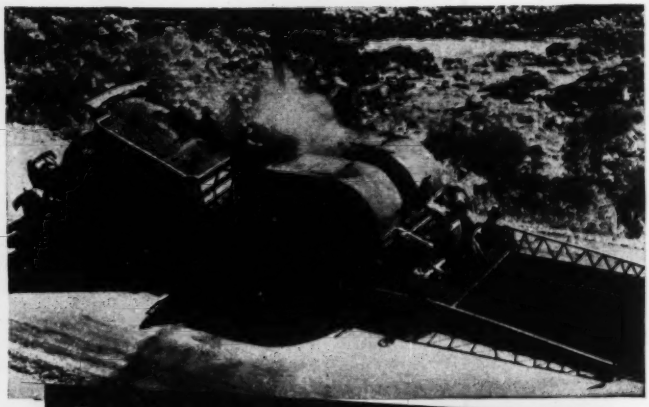

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age sufficient to cover 3,500,000 acres land 1 ft. deep) **$40,000,000.** A. M. Ainsworth, 1st. Natl. Bank Bldg., El Paso, and Lloyd McIntosh, c/o Fort McIntosh, Laredo, consult. engrs. CD 1/31/46—ENR 11/14/46.

AIRPORTS AND AIRBASES

Mass., North Adams—AIRPORT IMPRVS.—City, Airport Comn., City Hall, airport imprvs. **$200,000.** Fay, Spofford & Thorndike, 11 Beacon St., Boston, engrs.

Okla., Lawton—AIRPORT—City, George Hutchins, mayor, plans by Sorey Hill & Sorey, 2603, 1st. Natl. Bank Bldg., Oklahoma City, airport imprvs., incl. runway exten., water, sewer, electric lines, lighting, administration bldg., parking area, access roads. **$346,300.** Wyatt Hendrick, Lawton, consult. engr. CD 1/14/47—ENR 3/6/47.

S. D., Aberdeen—AIRPORT—City, plans by G. W. Shiflet, 17 W Franklin Ave., Minneapolis, Minn., administration bldg. **$110,000.** CD 9/16—ENR 9/23.

Tex., Dallas—AIRPORT IMPRVS.—City plans lengthening and paving runways, taxiways and aprons, Hensley Municipal Airfield. **$690,000.** CD 4/1—ENR 4/15.

●†**Tex., Wichita Falls**—AIR BASE—U. S. Eng., 416 Wright Bldg., Tulsa, Okla., air base, enlarging Sheppard Field into pilot training center. **$2,000,000.**

LATIN AMERICA

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans pipeline from Buenos Aires to Comodora Rivadavia. **44,000,000** Pesos. Direccion General del Gas del Estado, Buenos Aires, engr. CD 4/7/47—ENR 4/17/47.

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans bottled gas plant. **12,000,000** Pesos; gas plant and distr. station. **44,000,000** Pesos. Direccion General del Gas del Estado, Buenos Aires, engr.

B. W. I., Bridgetown—Govt. of Barbados, Bridgetown, plans harbor imprvs. **$1,000,000.** Dpt. Wks., Bridgetown, engr.

B. W. I., San Fernando—Govt. of Trinidad, Port of Spain, plans harbor imprvs. **$300,000.** Dpt. Wks., Port of Spain, Trinidad, engr.

Chile, Chuquicamata—Chile Exploration Co., Santiago, plans concentrating, smelting and refining plant for treatment of copper sulfide ores. **$10,000,000.**

Colombia, Barranquilla — Industria Colombiana de Rayon, S. A., Barranquilla, plans extensive alterations to sulfuric acid plant. **$200,000.**

Mexico, Mineral del Chico — Miguel Angel Borbobbia & Assoc., Pachuca Chamber of Commerce, Pachuca, Hidalgo, plans tourist center. **$3,000,000.**

Mexico, Puebla—La Perla, S. A. Av. Poniente, 136, Puebla, Pue, plans cotton mill. **$350,000.**

Paraguay, Asuncion—Republic of Paraguay, Asuncion, plans dredging and river clearance on the Paraguay River. **$150,000.** Ministry P. Wks., Asuncion, engr.

Venezuela, Guacara — Venezuela Development Corp., Caracas, plans grain and food storage centres at Guacara and at Lara. **$350,000.**

PUBLIC BUILDINGS

Ala., Jasper—Walker Co., Bd. Educ., Jasper, plans by Wilmot C. Douglas, 226 N. 14 St., Birmingham, high school. Over **$250,000.**

†**Ark., Little Rock**—Pub. Bldgs. Admin., 18 and F Sts., N. W., Wash. 25, D. C., office, **$5,500,000.**

Calif., Anderson — Anderson Union High School Dist., plans by Masten & Hurd, 526 Powell St., San Francisco, high school addns. **$250,000.** CD 12/27.

Calif., Fullerton — Fullerton Union High School Dist. plans by William H. Harrison, 816 W. 5 St., Los Angeles, rein.-con. high school. Over **$250,000.** CD 1/22/47—ENR 2/6/47.

●**Calif., Los Angeles**—Bd. Educ., 1425 S. San Pedro St., plans by Albert C. Martin Assoc., 33 S. Beaudry St., San Fernando High School, 2 story classroom bldgs., auditorium, administration bldg., cafeteria, gymnasium, near San Fernando. **$2,000,000.**

Calif., Los Angeles—Bd. Supervs., Los Angeles Co., 501 Hall of Records, plans by Jack H. Macdonald, 1013 E. 8 St., community center bldgs. at Lakewood Pan American Park, Laguna Park, Alondra Park, Garvey Memorial Park, Belvedere Park, and John S. Simms Park. **$350,000.**

●**Calif., Norwalk** — Excelsior Union High School Dist., Pioneer Blvd. and Center Sts., plans by Kistner, Curtis & Wright, 816 W. 5 St., Senior High School for Bellflower Area. Over **$1,000,000.**

Calif., Pinole—Pinole Hercules Elementary School Dist., Pinole, plans by J. J. Buchter, 41 Moraga Highway, Orinda, wood or rigid frame El Sobrante School. **$250,000.** CD 10/7 ENR 10/28.

Calif., Roseville—City, City Hall, plans by C. C. Cuff, 1315 Q St., Sacramento, municipal hospital. **$750,000.** CD 11/24—ENR 12/9.

Colo., Adams City—Bd. Educ., preliminary plans by T. H. Buell & Co., engrs. and archts., 730 14 St., Denver, 14 room school. **$345,000.**

Colo., Denver—School Dist. 1, City and Denver Co., W. W. Grant, pres., 414 14 St., plans by G. Meredith Musick, 1000 Patterson Bldg., Stedman School addn., **$250,000**; Beach Court School addn., **$400,000.**

Colo., Derby—Adams Co. Bd. Educ., Derby, preliminary plans by T. H. Buell & Co., engrs. and archts., 730 14 St., Denver, 10 room school. **$250,000.**

Colo., Ft. Collins—Colorado A. & M. College, Ft. Collins, plans by Sidney G. Frazier, engr. and archts., Greeley Bldg., Greeley, 1 and 2 story, brick veterinary hospital. **$400,000.**

Colo., Lakewood—Lakewood Bd. Educ., W. 10 St. and Wadsworth Ave., plans by John K. Monroe, engr. and archt., Security Bldg., Denver, school. **$250,000.**

Connecticut—State, G. Albert Hill, hy. comr., State Office Bldg., Hartford, brick restaurant, Wilbur Cross Parkway. **$500,000.**

Conn., Durham—Bd. Selectmen, Town Hall, plans by Schilling & Goldbecker, 405 Temple St., New Haven, brick, steel high school addn. **$250,000.**

Conn., East Haven—Town, School Bd., East Haven, plans by Harold H. Davis, 29 Whitney Ave., New Haven, 2 story, bsmnt., 8 room, brick, steel school, South Dist., **$280,000**; remodel Union School, **$115,000**; 3 room, brick addn. to Momaugin School, **$140,000.**

Conn., Greenwich—Town, Bd. Educ., Greenwich, plans by Coffin & Coffin, 125 E. 46 St., New York, N. Y., W. B. Tubby Jr., 44 Madison Ave., New York, N. Y., Philip Nichols Sunderland, Inc., 81 West St., Danbury, 2 story, bsmnt., brick, steel, concrete addn. to Havemeyer School, **$450,000.** F. N. Severud, 415 Lexington Ave., New York, N. Y., structural engr. C. W. Hubbard, 115 Greenwich Ave., mechanical engr.

Conn., Hartford — City, Engineering Dpt., Municipal Bldg., 550 Main St., brick, steel, 9,000 persons capacity, auditorium designed for hockey, boxing, basketball, wrestling, etc. Over **$250,000.** H. Irving Skilton, Municipal Bldg., engr.

●**Conn., Manchester**—U. S. Eng., Bldg., 21 Naval Dry Dock, South Boston, Mass., 1 story, 52 x 130 ft., brick, storage garage for motor vehicles.

●**Conn., Mystic**—U. S. Eng., Bldg. 21, Naval Dry Dock, South Boston, Mass., 1 story, 55 x 130 ft., and 17 x 50 ft., brick, concrete, garage, office.

●**Conn., West Haven**—U. S. Eng., 75 Federal St., Boston, Mass., plans by Curtin & Riley, 45 Newbury St., Boston, Mass., brick, steel, 400-bed tuberculosis unit and 500-bed medical-surgical unit hospital, Campbell Ave. **$15,000,000.** CD 4/16—ENR 4/22.

Conn., Westport—Town, Westport Housing Authority, Charles E. Cutler, chn., frame unit, moderate rental housing. **$250,000.**

Conn., Willimantic—City, Willimantic Housing Authority, Luke Hevrin, chn., plans by A. R. Sharps, RFD 1, 16 addn. duplex units, brick houses. **$250,000.**

●**Fla., Gainesville**—State Bd. Control, Tallahassee, plans by Guy Fulton, archt., State Bd. Control, and Kemp, Bunch & Jackson, Florida Theatre Bldg., Jacksonville, student dormitories. **$4,628,000.**

Ga., Atlanta—Fulton Co. plans by Stevens & Wilkinson, 157 Luckie St. N. W., rebuilding E. Rivers School destroyed by fire. Over **$300,000.**

Idaho, Weiser—City, hospital. **$456,000.**

Ill., Chicago—Chicago Housing Authority, 343 S. Dearborn St., plans by Perkins & Will, 309 W. Jackson Blvd., 100 unit housing, Site 1, Racine, 108 and 110 Sts.; plans by Friedman Alschuler & Sincere, 223 W. Jackson Blvd., 200 unit housing, Site 2, Cicero and 44 Sts.; plans by Skidmore, Owings & Merrill, 100 W. Monroe St., 110 unit housing, Site 3, Ogden, Fairfield, and Talman Sts.; plans by Shaw, Metz & Dolio, 208 S. La Salle St., 130 unit housing, Site 4, Hoyne and 33 Sts.; plans by Pace Assoc., 53 W. Jackson Blvd., 90 unit housing, Site 5, Francisco, Sacramento, Harrison and Van Buren Sts.; plans by Loebl, Schlossman & Bennett, 333 N. Michigan Ave., 120 unit housing, Site 6, Van Buren, Jackson and Maplewood Sts.

Ia., Ames — State Bd. Educ., 1007 Des Moines St., Des Moines, agronomy bldg. at State College. **$750,000.**

Ia., Osage—Mitchell County Hospital, Walter E. Sheldon, secy. Bd. Trustees, c/o Home Trust & Savings Bank, Osage, plans by M. B. Cleveland, 424 E. 4 St., Waterloo, rein.-con., brick, steel, stone hospital. **$260,000.** CD 11/11—ENR 12/9.

Ia., Osceola—Clarke Co., Osceola, plans by H. T. Fisher & Assoc., 322 W. Washington St., Chicago, Ill., hospital. **$265,000.** CD 12/17/47—ENR 4/8/48.

Kan., Ellsworth—Ellsworth School Dist., Joel N. Martin, supt., defeated **$340,000** bonds, brick, concrete school. **$340,000.** Project indefinitely postponed. CD 9/20—ENR 9/23.

Kan., Emporia—Bd. Educ. plans by Brinkman & Hagan, Emporia, Walnut Elementary School. **$300,000.**

Kan., Manhattan—State Bd. Regents, Topeka, plans by J. F. Johnson, acting state archt., Topeka, Kansas State College All Faith Memorial Chapel wing. **$275,000.**

Kan., Overlook Park—School Dist. 38, 6313 W. 83 St., plans by J. W. Radotinsky, 1401 Fairfield Trafficway, Kansas City, Kan., school. **$275,000.** CD 12/15.

●**Kan., Topeka**—State, State House, plans by C. L. Marshall, state archt., State House, state office bldg. **$4,684,000.**

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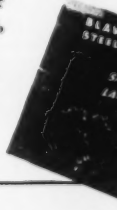

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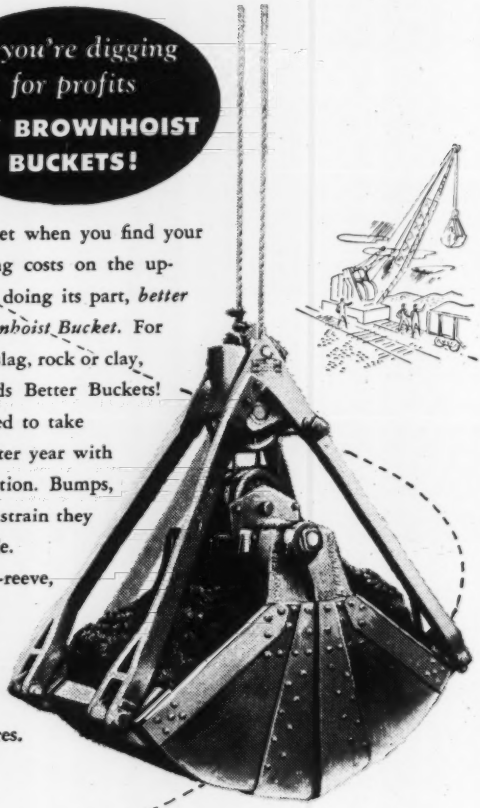

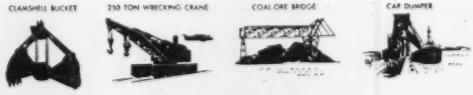

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BOSTON • CINCINNATI • NEW ORLEANS

●**Ky., Louisville**—Kentucky State Fair Bd., Louisville, state fairgrounds, incl. stadium, coliseum, 2 livestock pavilions, midway site, parking space, **$6,000,000.**

Md., Baltimore—Mayor & City Council, City Hall, plans completed by Gaudreau & Gaudreau, 527 N. Charles St., 2 story addn. to gymnasium and 5 story addn. to Dunbar Junior and Senior High School, Caroline and McElderry Sts. CD 1/16—ENR 2/5.

Mass., Bedford—Town, Housing Authority, Town Hall, plans by James H. MacNaughton, 63 Newbury St., Boston, veterans housing, over **$250,000.**

Mass., Bernardston—Town School Dpt., Bernardston, plans by Alan Bartlett, 17 Elliot St., Brattleboro, Vt., school, **$250,000.**

Mass., Boston — City, Library Dpt., Copley Square, library addn. Approx **$250,000.**

Mass., Boston—City, Real Estate Comm., City Hall Annex, plans by Thomas Worcester, Inc., archt. and engr., 74 State St., 3 story, concrete garage, Essex and Lincoln Sts. **$460,000.**

●**Mass., Boston** — Mass. General Hospital, Fruit St., plans by Coolidge, Shepley, Bullfinch & Abbott, 1 Court St., 8 story, brick, steel 48 x 162 ft., disease control research bldg. **$2,750,000.**

●**Mass., Cambridge**—City Housing Auth., 1416 Massachusetts Ave., 45 unit veterans housing, Harvard and Prospect Sts., **$450,000;** plans by Desmond & Lord, 6 Beacon St., Boston, 3 story in front, 6 and 8 story in rear, 216 unit brick veterans housing, Cambridge St. between Willow and Windsor Sts. **$2,000,000;** plans by William L. Galvin, 38B Brattle St., 66 unit veterans housing, Walden St., North Cambridge, **$650,000.**

Mass., Concord — Town, Hugh Cargill Farm School **$250,000.**

Mass., East Longmeadow—Town, School Dpt., plans Junior High School, over **$250,000;** school, over **$250,000.**

Mass., Foxboro—Commonwealth of Mass., Dpt. Mental Health, 100 Nashua St., Boston, plans by Wm. G. Upham, 700 Washington St., Norwood, rear center and dining hall reconstr., State Hospital. Contr. P-M 31. **$756,000.** CD 11/1/45—ENR 12/13/45.

Mass., Franklin—Town Housing Authority, A. Bullikian chm., Hillside Rd., plans by **Harold E. Mason,** 53 Merriam Ave., Leominster, **28** unit housing, **$275,734.** CD 11/17—ENR 12/9.

●**Mass., Holyoke**—Commonwealth of Mass., Admin. & Finance Dpt., State House, Boston, plans by Wm. Nelson Jacobs, 460 Park Sq. Bldg., Boston, 5 story, bsmt., brick, reinf. con. veterans home, incl boiler room, laundry water tower, etc., **$3,000,000.**

Mass., Lynn—City Housing Authority, Lynn, plans by Lipinski & Valtz, 113 Market St., 54 unit housing, **$540,000.**

Mass., North Adams — City, North Adams Housing Auth., J. R. Ruane, chm., 105 Main St., plans by F. A. Stickney, 85 Main St., 65 unit veterans housing, greylock park, **$650,000.** CD 5/27—ENR 6/10.

Mass., Sheffield and New Marlboro—Towns of Sheffield and New Marlboro, plans by **Harold E. Mason,** 53 Merriam St., Leominster, Area High School, **$250,000.**

Mass., Southbridge—Town Housing Authority, R. S. Normandin, exec. dir., 305 Main St., plans by Harold E. Mason, 53 Merriam Ave., Leominster, 35 unit housing, **$350,000.** CD 11/15—ENR 12/2.

Mass., Sterling—Towns of Sterling and Princeton, plans by Harold E. Mason, 53 Merriman Ave., Leominster, 2 story, L-shaped, brick, regional high school **$700,000.**

Mass., Uxbridge—Town Housing Authority, Uxbridge, plans by Harold E. Mason & E. L. Baker, 42 Main St., Leominster, 22 unit veterans housing, High St. Approx. **$250,000.**

Mass., Webster—Town, Housing Authority, John Barnby, chm., 129 Main St., 31 unit veterans housing, **$306,393.**

Mass., West Boylston—Town, School Dpt., West Boylston, plans by Harold E. Mason, 53 Merriam Ave., Leominster, high school addns. alterations **$250,000.**

Mass., West Concord — Town, Town Hall school, Pleasant St. **$250,000.**

Mass., Winthrop—Town Housing Authority, E. R. Thomas, chm., Town Hall, plans by Arthur G. Manasclian, 30 Huntington Ave., Boston, 73 unit veterans housing **$726,000.** CD 11/10—ENR 11/25.

●**Mich., Port Huron**—School Dist., 502 Stanton St., plans by Frantz & Spence, Saginaw, high school, incl. gymnasium, power plant, classrooms, laboratories, auditorium, stage, bank room, cafeteria, dining room, kitchen, swimming pool. **$3,750,000.** CD 10/10/46—ENR 11/14/46.

Minn., Minneapolis—City and Hennepin Co., G. R. Arneson, city purch. agt., 223 City Hall, plans by Long & Thorshov, 400 Metropolitan Life Bldg., reroofing courthouse (joint city hall and court house), 4 and 5 Sts., 3 and 4 Aves. S. **$280,000.** R. D. Thomas & Assoc., 400 Metropolitan Life Bldg., engrs. CD 9/14—ENR 9/16.

Minn., Minneapolis—University of Minnesota, R. S. Callaway, purch. agt., 323 Administration Bldg., plans by C. J. Johnston, 715 Empire Bank Bldg., St. Paul, field house alterations **$607,000.**

Miss., Jackson—City, plans by James T. Canizaro, Deposit Guaranty Bank Bldg., jail

and court bldg. **$300,000.** CD 3/7/46—ENR 5/10/46.

Mont., Sidney—Bd. Educ., Sidney, plans by C. C. Cohagen, Billings, grade and high school. **$275,000.**

Mont., Butte—Silver Box Co., Courthouse, voted **$995,000** bonds recreation center. CD 6/28—ENR 7/8.

Neb., Alliance—Bd. Educ., Alliance, plans by E. G. Schaumberg, 614 Federal Securities Bldg., Lincoln, Junior and Senior High School. **$300,000.** CD 6/13/46—ENR 7/25/46.

Neb., Fremont—City, plans by Davis & Wilson, 225 Stuart Bldg., Lincoln, buildings, various recreational facilities as a War Memorial. **$350,000.** George Grave & H. N. Turner, Fremont, consult. engrs. CD 10/2/47—ENR 10/16/47.

Neb., Grand Island—Bd. Educ., Grand Island, school. **$275,000.**

Neb., McCook—Bd. Educ., McCook, bond election Feb. 8, school. **$250,000.** J. W. Radotinsky, Natl. Bank of Kansas Bldg., Kansas Bldg., Kansas City, Kan., archt. CD 8/17/45—ENR 9/6/45.

●**N. J., Montclair**—School Bd., school. **$2,000,000.** CD 4/16/46.

●**N. Y., New York**—New York City Housing Auth., 63 Park Row, Zone 7, plans by John Thompson, 111 E. 40 St., Zone 17, eleven 14 story bldgs. on 16.7 acre site bounded by Exterior St., W. 225, W. 230 and W. 228 Sts., Broadway and Marble Hill Ave. **$15,000,000.** Tuck & Elpel, 101 Park Ave., Zone 17, structural engrs. Thomas E. Kennedy, 225 Lafayette St., Zone 12, mechanical engr. Janet Darling, Innocenti & Webel, 111 E. 40 St., Zone 17, landscaping engrs. CD 12/6—ENR 12/23.

●**N. Y., New York**—New York City Housing Auth., 63 Park Row, Zone 7, plans by Whitlesey, Prince & Reilly, 31 Union Square, Zone 3, Colonial Park Houses, eight 14 story bldgs., with 993 apartments on 9.7 acre site bounded by Harlem River Dr. Polo Grounds and Harlem River Driveway. **$9,400,000.** Charles Mayer, 31 Union Square, Zone 3, structural engr. Philip M. Gussow, 132 Nassau St., Zone 7, mechanical engr. Coffey & Reecknagel, 41 Union Square, Zone 3, landscaping archts. CD 4/13—ENR 4/29.

●**N. C., Lenoir**—Caldwell Memorial Hospital, Lenoir, plans by Erie G. Flannagan, engr. and archt., McCoin Bldg., Henderson, 100-bed general hospital. **$1,200,000.**

N. C., Yadkinville—Yadkin Co. Hospital, c/o Ray T. Moore, clk. to Bd. Co. Comrs., 30-bed hospital. Over **$250,000.**

N. D., Fargo—State Bd. Higher Educ., Bismarck, engineering bldg. **$515,000;** live stock bldg. **$260,000,** at North Dakota Agricultural College.

N. D., Grafton—State Bd. Admin., Bismarck, hospital and storage bldg. at State School for Feeble Minded. **$260,000.**

N. D., Grand Forks—State Bd. Higher Educ., Bismarck, administration bldg. at University of North Dakota. **$514,700.**

O., Akron—Akron Community Service Center, c/o Joseph Thomas, 199 Perkins St., plans by M. M. Konarski, archt. and F. W. Stafford, engr., 844 W. Market St., 114x165 ft. community bldg., incl. gymnasium-auditorium, swimming pool, cafeteria, offices, meeting rooms, etc. **$400,000.**

O., Chesapeake—Bd. Educ., Chesapeake, high school. **$700,000.** CD 12/3/45—ENR 1/3/46.

O., Columbus—Children's Hospital, 561 S. 17 St., plans by Wagner & Luxmore, Permanent Bldg., Akron, 4 story T shaped wing, rear of existing bldg., exten. across Raymond St. north toward Donaldson St. Approx. **$750,000.**

O., Kent—Kent State University, Dr. George A. Bowman, pres., Kent, applied arts bldg. **$825,000.**

O., Youngstown—Bd. Educ., State and Wilson Sts., plans by Scheibel & Shaffer, 1301 Realty Bldg., 18 room school, Williamson Ave. **$250,000.** CD 5/15/47—ENR 5/29/47.

Okla., McAlester—Bd. Affairs, State Capitol Bldg., Oklahoma City, plans by Coston & Frankfort, Apco Tower, Oklahoma City, remodel prison hospital. **$250,000.**

Okla., Stillwater—City, voted $200,000 bonds, municipal hospital. **$300,000.** Phillip A. Wilber, College Campus, Stillwater, archt. CD 11/7/47—ENR 11/27/47.

Okla., Stillwater—Oklahoma A. & M. College, Stillwater, plans by Winkler & Reid, Derr-McGee Bldg., Oklahoma City, agricultural hall. **$300,000.**

Okla., Tulsa—Tulsa Co., county health center. **$600,000.**

Ore., Medford—School Bd., Medford, voted bonds, Junior High School addn. **$275,000.** CD 3/5/46.

Pa., Lansdowne—Lansdowne Boro School Bd., Lansdowne, plans by Lewis P. MacKenzie, 117 S. 7 St., Phila., school addn., Green and Clover Aves., **$250,000.** Sauter & Castor, 1411 Walnut St., Phila., consult. engrs.; plans by Lewis P. MacKenzie, 117 S. 17 St., Phila., school, **$400,000.** CD 1/6/47—ENR 1/23/47.

●**Pa., Mercer**—Joint Mercer Consolidated School Bd., Mercer, plans by Kling & Frost, 661 Wick Ave., Youngstown, O., 2 story, brick, steel Junior Senior High School, concrete floor, **$1,176,000.**

Pa., Pennsburg—Pennsburg Boro, plans by Lewis P. MacKenzie, 117 S. 17 St., Phila., civic center and gymnasium. **$250,000.**

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Pa., Pittsburgh—City, City County Bldg., plans by Button & McLean, 119 E. Montgomery St., 1 story, steel, brick, stone conservatory, West Park, N. Side. **$250,000.**

Pa., Pottstown—Pottstown School Dist., school. **$250,000.**

●**R. I., East Providence** — Town, Stanley H. White, 135 Arnold St., brick, steel high school, Pawtucket Ave. near Taunton Ave. **$1,500,000.** CD 2/25/46.

Tenn., Nashville—Davidson Co. Bd. Educ., County Courthouse, maintenance plant for county school sys. **$300,000.**

Tex., Aldine (Orange P. O.)—Aldine School Dist., L. C. Courtney, supt., bond election Jan. 29, school and gymnasium, and classrooms. **$300,000.** CD 11/27/46—ENR 12/12/46.

Tex., Gatesville—Gatesville State School for Boys plans by R. E. Blair, c/o owner, dormitory, **$250,000;** gymnasium **$250,000.**

●**Tex., Houston**—Houston Independent School Dist., 1600 Washington St., plans by Stayton Nunn, co-ordinating archt., 2047 W. Gray St., masonry schools in Braes Heights area, San Felipe West Oaks School **$275,000;** Wesleyan Road School **$250,000;** Westfield-Aldine-Parker Roads School **$250,000;** school **$275,000.** CD 6/23/47—ENR 7/10/47.

Tex., Palestine — Anderson Co., Palestine, voted bonds, 60-bed hospital, **$594,900-$750,000.** Shirley Simons, 722½ S. Bois d' Arc, Tyler and O. L. Hazelwood, Palestine, archts. CD 11/17—ENR 12/23.

●**Tex., Pasadena**—City, Sam Hoover, mayor, 150-bed municipal hospital. **$1,000,000.** CD 6/26/47—ENR 7/10/47.

●**Tex., San Antonio**—State Bd. Control, Hal Logan, chn., Austin, tuberculosis hospital unit, **$600,000;** employees housing, **$300,000;** operation and maintenance shop, **$80,000;** power house, paint shop, mattress shop, steam tunnels, **$125,000;** Ward No. 1 **$300,000,** Ward No. 2 **$350,000,** Ward No. 3 **$400,000,** masonry, steel, concrete constr. for San Antonio State Hospital, S. Presa St. CD 12/9—ENR 12/23.

Tex., Snyder—Snyder Independent School Dist., Snyder, plans by Buford & Steinberg, 1801 San Jacinto St., Dallas, primary school. **$250,000.** Bonds voted.

Tex., Sundown—Sundown Independent School Dist., Sundown, voted bonds, high school. **$300,000.**

●**Tex., Terrell**—State Bd. Control, Hall Logan, chn., Austin, 550-bed masonry, steel, concrete hospital. **$2,000,000.**

●**Va., Lynchburg**—State Hospital Bd., c/o Pendleton S. Clark, archt., Lynchburg, Lynchburg State Hospital addn. **$2,000,000.** CD 12/6/44—ENR 12/28/44.

●**Va., Staunton**—State Hospital Bd., c/o Marcellus Wright & Son, archts., 1113 E. Main St., Richmond, Western State Hospital addn. **$2,000,000.** CD 12/6/44—ENR 12/28/44.

†**Wash., Celilo Falls** — Bureau of Indian Affairs, Dpt. Interior, Merchandise Mart, Chicago 54, Ill., reconstructing Indian Village. **$125,000.**

●**Wash., Edmonds**—School Bd., Edmonds, special levies election Feb. 1, high school and administrative center, **$800,000;** Edmonds, Esperance and Alderwood Manor Schools addns., **$205,000** each. W. A. Johnson & Assoc., Everett, archts. CD 7/1/46—ENR 8/8/46.

Wash., Leavenworth—School Dist. 128, Leavenworth, plans by W. H. Rothe, Liberty Bldg., Yakima, school. **$300,000.** CD 12/16—ENR 1/6.

Wash., Mercer Island—School Bd., Mercer Island, plans by Naramore, Bain, Brady & Johanson, Dexter Horton Bldg., Seattle, Zone 4, school. **$313,000.** CD 11/10—ENR 12/9.

●**Wash., Pullman**—Washington State College, Pullman, plans by J. W. Maloney, Larson Bldg., Yakima, student union bldg. **$3,000,000;** plans by E. J. Peterson, Hutton Bldg., Spokane, 3 story feed processing plant, **$150,000.** CD 5/28/45—ENR 6/14/45.

Wash., Wiley City—Ahtanum Valley Consolidated School Dist., 127, Wiley City, school. **$450,000.**

Wash., Yakima—School Dist. 7, 124 S. 5 Ave., plans by J. W. Maloney, Larson Bldg., H. M. Gilbert School. **$277,000.** CD 1/16/46—ENR 2/7/46.

Wis., Appleton—Bd. Educ., Appleton, plans by Law, Law, Potter & Nystrom, 121 S. Pinckney St., Madison, 2 story, part bsmnt., main sect., L shaped 348 ft. long school, other 2 sections 1 story. CD 10/18/45—ENR 11/15/45.

Wis., Waunakee—Bd. Educ., Waunakee, plans by Joseph G. Durant, Roscobel, high school. **$250,000.**

Wyo., Riverton—City, c/o School Bd., voted bonds, school, **$325,000;** school addn. **$325,000.**

●**Alaska, Anchorage** — Independent School Dist., Anchorage, bond election Jan. 25, Spenard school, **$400,000;** Mountain View School, **$400,000;** school near golf park, **$800,000.** CD 6/3—ENR 6/24.

●**B. C., Vancouver**—Vancouver School Bd., 590 Hamilton St., plans by Mercer & Mercer, 615 W. Hastings St., rein.-con. L shaped John Oliver High School addn., incl. work shops, administration section and gymnasium. **$1,000,000.** CD 9/28/43—ENR 9/30/43.

●**Man., Winnipeg**—School Bd., Winnipeg, plans by W. A. Martin, William and Ellen Sts., schools Brock St. and Jackson Ave.; Garwood Ave. and

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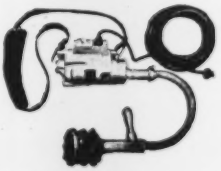

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Rockwood St.; Telfer St. and Sargent Ave. Approx. $400,000 each. CD 12/1—ENR 12/23.

Man., Winnipeg—City, Wm. Courage, supervs., c/o owner, 3 story, brick apartment. Approx. $600,000. CD 4/30/43—ENR 5/6/43.

Man., Winnipeg—School Dist. 1, William and Ellen Sts., plans by W. A. Martin, c/o owner, school, Brock St. $400,000.

N. B., Edmundston—Bd. Educ., Edmundston, plans by L. Turcotte, 308 St. Jean St., Quebec City, Que., high school. Approx. $350,000. CD 1/17/46—ENR 3/7/46.

N. B., Woodstock — Carleton County Bd. School Trustees, C. J. Jones, K. C. town clk., high school. Approx. $400,000.

●**N. S., Dartmouth**—Province of N. S., Halifax, Nova Scotia Hospital addn. $1,000,000. Architect, c/o Dpt. Health, Halifax, archt. D. J. E. Belliveau, Dpt. P. Wks., Halifax, engr. CD 10/24/46—ENR 11/14/46.

N. S., Halifax—City and Halifax Bd. School Comrs., Halifax, completing gymnasium and auditorium Queen Elizabeth High School. Approx. $750,000. CD 7/17/46—ENR 8/8/46.

●**N. S., Halifax**—Dpt. P. Wks., Halifax, N. S., Nova Scotia Hospital addn., Woodside, Dartmouth. Approx. $1,000,000. J. E. Belliveau, c/o owner, engr. CD 7/17/46—ENR 8/8/46.

N. S., Lockeport—High School Bd., Lockeport 2 story, 58x119, 49x117 ft., concrete, brick school. $350,000.

N. S., St. Margarets Bay (Postal Dist. Halifax)—Province of N. S., Halifax, high school. $250,000. CD 4/16/45—ENR 4/19/45.

Ont., Pembroke — Pembroke Electric Light Co. Ltd., Pembroke, addnl. power generator, two 3,000 hp. units at power plant, Black River. Approx. $800,000.

COMMERCIAL BUILDINGS

Ala., Mobile—Y. W. C. A., c/o R. Wilson & T. Howard Ellis, archts., First National Bank Bldg., Y. W. C. A. Bldg. $295,000.

Calif., Beverly Hills—Leavitt & Gershenson, 474 S. Weatherly Dr., plans by McGraw & Carrere, 2611 Palm Ave., Manhattan Beach, 4 story rein.-con. store, $700,000.

Calif., Chester—Seneca Hospital Dist., Chester, plans by Douglas D. Stone & Louis B. Mulloy, 619 California St., San Francisco, hospital. $250,000.

Calif., Culver City—Culver City Properties, c/o Touchstone & Touchstone, 810 S. Spring St., Los Angeles, plans by Harold S. Johnson, 606 S. Hill St., Los Angeles, department store for J. C. Penney Co. $320,000.

Calif., Culver City—Culver City Properties, c/o Touchstone & Touchstone, 810 S. Spring St., Los Angeles, plans by Nelson P. Rice, 354 S. Spring St., Los Angeles, department store for W. T. Grant Co. $100,000.

●**Calif., Menlo Park**—Menlo Homes, Inc., c/o Claude T. Lindsay Co., 564 Market St., San Francisco, 475 residences in Timothy Hopkins Estate. $6,000,000.

●**Calif., San Francisco**—Hastings College of Law, Van Ness near McAllister St., law school bldgs. $1,450,000.

●**Calif., San Jose**—Community Service Hospital, 14 and E. Santa Clara Sts., plans by Douglas D. Stone & Lou B. Molloy, 619 California St., San Francisco, and Binder & Curtis, 35 W. San Carlos St., San Jose, 5 story hospital addn. $1,000,000. CD 4/10—ENR 5/1.

Calif., San Jose—Lawrence Borg, c/o Kent & Haas, archts., 525 Market St., San Francisco, rein.-con. theatre. $250,000.

Calif., Sebastopol—Drs. Carl W. La Force, Jr. & Senior and Chas. R. McNulty, 408 S. Main St., 100 bed Chiropractic Hospital at Tomales Bay. $500,000.

Conn., Manchester — Manchester Memorial Hospital, Judge Wm. J. Shea, chn. Bldg. Comn., 71 Haynes St., plans by Ebbets, Frid & Prentice, 862 Asylum Ave., Hartford, 3 story, bsmnt. hospital addn., Haynes St. $500,000. CD 11/15/44—ENR 11/30/44.

Fla., Surfside—Owner, c/o J. J. Debrita, archt., 7625 Biscayne Blvd., Miami, 85 room hotel. Over $300,000.

Ind., Indianapolis — Butler University, Lemcke Bldg., plans by Robert Frost Daggett, 250 E. Fall Creek Blvd., N. Drive, 3 story, bsmnt., stone, brick, rein.-con., steel College of Pharmacy addn., Fairview campus. $700,000.

Ia., Cedar Rapids—Iowa Mutual Liability Insurance Co., Ray J. Mills, pres., 512 Second Ave. S.E., 3 story, brick, concrete, steel office. Approx. $500,000.

Ia., Cedar Rapids—St. Lukes Hospital, plans by Ellerbe & Co., E. 505 First National Bank Bldg., St. Paul, Minn., hospital. $275,000.

Kan., Topeka—Grace Cathedral, 8 and Taylor Sts., plans by Raymond Coolidge, New England Bldg., cathedral addn. $250,000.

Md., Baltimore—Grace Roland Park M. E. Church, 309 Woodlawn Blvd., plans by A. Hensel Fink, 1701 Arch St., Phila., Pa., church and Sunday school. $300,000. CD 12/17/47—ENR 1/1/48.

Mass., Boston—American Mutual Liability Insurance Co., Park Square Bldg., office. Over $250,000.

●**Mass., Cambridge** — Massachusetts Institute of Technology, 77 Massachusetts Ave., gymnasium and other athletic facilities, $2,000,000; mechanical engineering and metallurgical laboratory, $1,000,000; laboratory (Biology-

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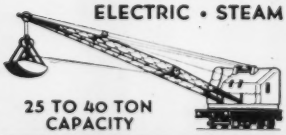

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Nutritional Biochemistry Food Technology) laboratory housing institutes work in biology, nutritional biochemistry and food technology, **$2,000,000**; hydrodynamics laboratory, **$550,000**; auditorium for lectures and concerts, over **$250,000**; electronic research laboratory for research laboratory of electronics already established but housed in wartime temporary quarters, **$1,100,000**; faculty club, over **$250,000**.

Mass., Garland—Memorial Hospital, c/o R. V. Virden, Garland, plans by W. C. Hedrick, engr. and archt., 904 Fort Worth Ave., Dallas, hospital. **$300,000**.

Mass., Great Barrington — Berkshire School, Deland De Windt, headmaster, plans by Hampson & Fisher, 30 Rockman Ave., Pittsfield, gymnasium. **$576,000**. CD 12/20/45—ENR 1/24/46.

●**Mass., Jamaica Plain**—John Dane Jr., 30 State St., Boston, apartment, Moss Hill. **$3,500,000**.

Mass., Waltham—Brandeis University, 415 South St., library. Approx. **$250,000**.

Minn., Hopkins — Engler Bros., 3401 Girard Ave. S., Minneapolis, 4 or 5 story, bsmnt. hotel. **$250,000**.

Minn., Minneapolis—Boulevard Plaza Corp., P. J. Karalis, pres., c/o G. Becker, archt., 1011 Currie Ave., theater and shopping center, Hy. 7 and Excelsior Blvd. **$500,000**.

Minn., Moorhead—Trinity Lutheran Church, Moorhead, 3 story, 50x80 ft. L shaped parish bldg. **$250,000**.

Minn., Robbinsdale—Volk Bros., c/o Liebenberg & Kaplan, 51 S. 13th St., Minneapolis, theater to seat 1,200 and shopping center. **$500,000**.

●**Minn., Rochester** — Mayo Clinic, plans by Ellerbe & Co., E. 505 First National Bank Bldg., St. Paul, 6 or 7 story, concrete, Medical Science Bldg. addn. **$1,500,000**.

Neb., Omaha — Catholic Archdiocese of Omaha, 2507 Cass St., parochial high school. **$600,000**.

●**N. Y., New York**—Columbia-Presbyterian Medical Center, Broadway and 168 St., cancer research unit consisting of 3 floors of laboratories on top of present Vanderbilt Clinic. **$1,000,000**.

N. Y., New York—1334 York Ave., Inc., Charles R. Benson, pres., 475 Fifth Ave., Zone 19, plans by Fellheimer & Wagner, 115 E. 42 St., Zone 17, office, store, shipping bldg. alterations, 1334 York Ave. **$250,000**.

N. Y., New York—Castleton Housing Corp., 5 Maiden Lane, Zone 7, plans by Gerald J. O'Reilly, c/o owner, 3 story apartment, Broadway near 252 St. **$450,000**.

N. C., Shelby — Dover Mills Foundation, J. R. Dover, Jr., pres., Shelby, recreation bldg., swimming pool and gymnasium. **$250,000**.

N. D., Grafton—Grafton Hotel Assn., Grafton, plans by Grosz & Anderson, Grand Forks, hotel. **$300,000**.

N. D., Grand Forks—Deaconess Hospital, 222 S. 4 St., plans by S. T. De Remer, 614 Viets Ave., hospital addn. **$500,000**. CD 11/24/47—ENR 12/4/47.

N. D., Minot—Young Mens Christian Assn., Minot, plans by G. H. Bugenhagen, Minot, Y.M.C.A. bldg. **$500,000**. CD 12/11/47—ENR 1/1.

●**O., Columbus**—Capital University, Harold L. Yochum, pres., 2199 E. Main St., new wing in Divinity Hall quadrangle, **$260,000**; wing to women's dormitory, **$100,000**; health and physical educ. bldg., **$750,000**.

●**O., Columbus** — Grant Hospital, 125 S. Grant Ave., plans by Louis F. Karlsberger, 630 E. Broad St., 8 story wing facing Town St. running back to Chapel St. **$1,500,000**. CD 7/30—ENR 8/19.

Okla., Ardmore—St. Marys Catholic Church, Ardmore, plans by J. B. White, Ardmoire, church. **$300,000**.

Okla., Duncan — Baptist Church, Duncan, plans by Paul Harris, Chickasha, auditorium. **$340,000**.

Okla., Enid—University Place Christian Church, Enid, plans by M. N. Wheeler, 1015 E. Main St., church auditorium. **$260,000**.

Okla., Mc Alester—St. Mary's Hospital, Mc Alester, plans by Leon B. Senter, Philtower Bldg., Tulsa, hospital addn. **$300,000**.

Okla., Oklahoma City—Bond Stores, Inc., 5 Ave., New York, N. Y., plans by Berlowitz & Commander, 1916 N. Broadway, remodeling, enlarging bldg., 132 W. Main St. **$250,000**.

●**Okla., Oklahoma City**—G. A. Nichols, Inc., 115 N. Harvey St., housing, on 160 acre tract. **$1,500,000**.

Okla., Oklahoma City—Trinity Baptist Church, 1425 N. W. 23 St., church auditorium, 1424 N. W. 24 St. **$350,000**. C. H. Guernsey, 1414 N. Robinson St., consult. engr.

Okla., Tulsa — Allen D. Strahm, 3020 S. Madison St., auto hotel, 2 and Boston Sts. **$300,000**. CD 11/7/47—ENR 12/4/47.

Okla., Tulsa—United Presbyterian Church, 1126 E. 34 St., plans by J. R. Koberling, 316 Court Arcade, church. **$250,000**.

●**Pa., Phila.**—Drexel Institute of Technology, 32 and Chestnut Sts., plans by Simon & Boulware, 123 S. Broad St., engineering bldg., classrooms and library, basic science bldg., students dining bldg., cafeteria, gymnasium. Approx. **$250,000** each. CD 12/1/47—ENR 12/11/47.

Pa., Phila.—Northeast National Bank, 8041 Frankford Ave., bank. **$250,000.**

Pa., Phila.—Overbrook Park Congregational, Edward Rosenwald, pres., Market St. Natl. Bank Bldg., synagogue. **$250,000.**

Pa., Phila.—Temple Israel of Wynnefield, 1981 Upland Way, synagogue. **$250,000.**

●**Pa., Pittsburgh**—U. S. Steel Corp., Koppers Bldg., and Mellon National Bank & Trust Co., 514 Smithfield St., preliminary sketches and studies by Wm. York Cocken, Century Bldg. and Harrison & Abramovitz, 45 Rockefeller Plaza, New York, N. Y., 40 story, 3 sub-bsmnt. office. **$15,000,000.** CD 9/7—ENR 9/16.

●**Pa., York**—York Hospital, York, hospital addns. **$2,500,000.**

R. I., Pawtucket—Alphage Ferlans & Sons, 709 Benefit St., housing development. Over **$250,000.**

S. C., Charleston—Frank J. Sottile, (Agt.), 99 Broad St., plans by William G. Lyles, Hissett, Carlisle & Wolff, 1302 Main St., Columbia, 76 unit apartment. **$695,000.**

S. D., Sioux Falls—First Baptist Church, 22 and Covell Sts., church. **$500,000.**

Tenn., Nashville—Y. M. H. A.-Y. M. W., 3814 West End Ave., plans by Hart, Freeland & Roberts, 3rd Natl. Bank Bldg., 2 story, bsmnt. Jewish community bldg. with swimming pool. **$500,000.**

Tex., Borger — Phillips Petroleum Co., Bartlesville, Okla., housing. Over **$250,000.** C. S. Walker, Borger, engr.

●**Tex., Houston**—Home Owned Properties, Scanlan Bldg., plans by Harvin C. Moore, 2608 W. Alabama St., 58.6 acre housing in Westhaven Estates, off Westheimer Rd., Sect. 1. **$1,000,000.** Edward G. Pearson, 3212 Smith St., proj. engr.

Tex., Houston — Charles Northrup Peck, Shell Bldg., 70 addnl. dwellings, in Galena Park, 12½ acre site. **$500,000.**

Tex., Houston—Tom D. Ruland & Assoc., Spring Branch, 80,000 sq. ft. masonry shopping center, slab and beam fdn., Katy and Brogden Rds. **$900,000.**

●**Tex., Houston**—St. Lukes Episcopal Hospital, 6265 Main St., (Dr. B. Weems Turner & Assoc., 506 Caroline St., sponsors), 60-bed urological hospital, teaching and research, Texas Medical Center, **$500,000;** plans by Wm. Ward Watkin, c/o Rice Institute, T. M. C. archt. representative, nurses and internes home, **$750,000;** plans by H. A. Salisbury, 3501 Buffalo Dr., and Staub & Rather, 500 Stuart St., 125 bed Texas Cardova Limestone hospital, **$1,000,000.** CD 9/7/45—ENR 9/20/45.

Tex., Houston — Texas Medical Center, 2017 W. Gray St., plans by H. Ed Maddox & C. A. Johnson, 2017 W. Gray St., masonry out patients bldg. **$275,000.**

Tex., Houston—R. C. West & Assoc., Citizens State Bank Bldg., housing, in portion of Pine Shadows sub-division. **$275,000.**

Tex., New Braunfels—Alfred Herry, New Braunfels, rock, brick hollow tile housing, between Fred. Rd. and New York Ave. **$273,-000.**

Tex., Wichita Falls—J. A. Simmons, 2816 Grant St., 1 story, brick veneer housing. **$250,000.**

Va., Norfolk—Roman Catholic Diocese of Norfolk, Rev. E. W. Johnston, chn. Bldg. Comn., Blow and Graydon Aves., plans by Gleeson & Mulrooney, 1612 Market St., Phila., and T. David Fitz-Gibbon, assoc. archt., Royster Bldg., Sacred Heart High School. **$600,000.** CD 1/30—ENR 2/19.

●**Wash., Seattle**—Pacific Telephone & Telegraph Co., 3 and Seneca Sts., Zone 1, plans by Bebb & Jones, Hoge Bldg., Zone 4, 13 story telephone bldg., 3 Ave. and Madison St. Over **$1,000,000.** M. O. Sylliaasen, Dexter Horton Bldg., Zone 4, consult. engr. CD 3/2—ENR 3/11.

●**Wash., Seattle** — C. A. Winkler, Greene-Winkler Co., 5 and Battery Sts., plans by E. W. Morrison, 719 2 Ave. Bldg., 18 story apartment. **$2,000,000.**

W. Va., Elkins—Davis & Elkins College, Elkins, plans by Harold P. Zeller, 51 E. 42 St., New York, N. Y., 1 story, 75x124 ft., concrete block, brick gymnasium. **$250,000.**

Alaska, Juneau — Charles Goldstein, Juneau, plans by Harold Foss, Juneau, 6 story, 75x100 ft. office. **$750,000.** CD 9/22—ENR 10/7.

N. B., Sackville—United Church of Canada, 550 Robie St., Halifax, N. S., Mount Allison University Addn. **$100,000.**

●**N. S., Halifax**—Young Mens Christian Assn., Central Bldg. Office, Halifax, 150x150 ft. Y. M. C. A. bldg., S. Park St. **$1,000,000.** CD 6/13/45—ENR 7/26/45.

Ont., Chatham—R. C. Diocese of London, c/o Bishop J. Kidd, 252 High St., London, church, rectory, convent and school, Lacroix St. **$250,000.**

Ont., Gravenhurst—National Sanatorium, 223 College St., Toronto, plans by A. Heeney, 73 Roustead Ave., Toronto, 3 story, bsmnt., concrete, steel, brick bldg. addn. **$250,000.** G. L. Wallace, 35 Isabella St., Toronto, engr.

Ont., Sault Ste. Marie—Algoma Home for Aged, B. R. McMullin, secy., ratepayers approve home for aged, Tarentorus Twp., Algoma Dist., 3 mi. from here, **$400,000.** Rounthwaite, Cameron, Murray & Fairfield,

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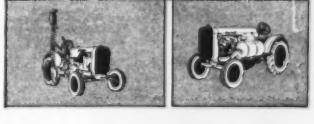
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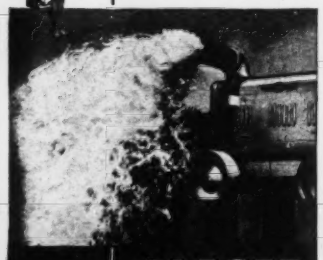

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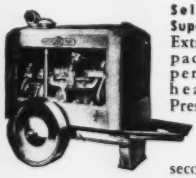

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22 Harbour St., Toronto, archts. Morrison, Hershfield, Millman & Huggins, 96 Bloor St. W., Toronto, engrs. CD 11/13/46—ENR 11/21/46.

Ont., Toronto—Stephen Parkin, 607 Dundas St. W., plans by O. Albrechtsen, 834 Yonge St., 3 story, bsmnt., concrete, brick hotel, 184-170 Spadina Ave. Approx. **$250,000.**

Ont., Windsor—L. Adelman, 150 Cassgrain Pl., plans by J. P. Thomson, 25 London St., reconstructing department store. **$325,000.**

Sask., Moose Jaw—Thorne, Ltd., 208 Scott Bldg., Moose Jaw, apartment block, Second St., at Athabaska St. Approx. **$500,000.** CD 8/10/45—ENR 8/16/5.

INDUSTRIAL BUILDINGS

Ariz., Phoenix—DEPOT—Pacific Greyhound Bus Lines, San Francisco, Calif., plans by H. H. Green, Security Bldg., 140 x 292 ft. steel, concrete, terra cotta, stucco bus depot. **$750,000.**

Fla., Jacksonville—OIL TERMINAL — Sinclair Refining Co., Talleyrand Ave., oil terminal on St. Johns River on 20 acre tract location of the former St. Johns River Shipbuilding Corp., incl. office, 5 warehouses, storage tank farm, tank car repair shop, unloading docks and loading facilities for both tank cars and truck loading racks. **$500,000.**

●**Ill., Chicago** — PLANT — Chicago Carton Co., 4200 S. Pulaski St., plans by Westcott Eng. Co., 205 W. Wacker Dr., three 1 story bldgs., one 2 story bldg., one bldg. 50 ft. high. **$2,500,000.** CD 10/25—ENR 10/28.

Ill., Granite City—FLY-ASH PRECIPITATORS—Granite City Steel Co., Hayward Neidringhaus, pres., Granite City, fly-ash precipitators for 4 smokestacks at plant's power house. **$250,000.** Peter Loftus Co., 610 Smithfield St., Pittsburgh, Pa., consult. engr.

●**Ia., Des Moines**—FACTORY—Wood Bros., 1700 E. Aurora St., factory expansion. **$1,000,000.**

Kan., Hays — GRAIN ELEVATOR — Farm Co-operative Assn., Hays, grain elevator. **$750,000.**

●**La., Baton Rouge** — ELECTRIC POWER GENERATING UNITS — Louisiana Electric Co-operative, Inc., Homer, electric power generating units. **$3,242,000.**

●**La., Bogalusa**—PLANT—Gaylord Container Corp., Vertress Young, vice pres., Bogalusa, bag plant. **$2,000,000.**

●**La., De Ridder**—ELECTRIC POWER GENERATING UNITS—Louisiana Electric Co-operative, Inc., Homer, electric generating power units. **$2,500,000.**

●**La., Farmerville**—ELECTRIC GENERATING POWER UNITS—Louisiana Electric Co-operative, Inc., Homer, electric generating power units. **$2,285,000.**

●**La., Natchitoches** — ELECTRIC POWER GENERATING UNITS—Louisiana Electric Co-operative, Inc., Homer, electric generation power units. **$5,570,000.**

Md., Easton — PLANT — owner, c/o Van Resselaer P. Saxe, archt., 109 W. Monument St., Baltimore, plant addn. **$100,000.**

Mo., Kansas City—PLANT—Kuhlman Diecasting Co., 5111 E. 24 St., plans by R. A. Larson, 2216 LaSalle Bldg., 8 E. 9 St., 130x50 ft. pumice block walls, architectural granite on exterior, concrete fdn., 40x60 ft. office section, air-conditioning. **$120,000.**

N. J., Clifton—PLANT—Allen B. DuMont Laboratories, Inc., 2 Main Ave., Passaic, tube plant. **$500,000.**

N. Y., New York—FACTORY—F. L. Smithe Co., 645 W. 44 St., Zone IX, plans by Walter M. Cory, 29-25 41 Ave., Long Island City, factory alterations, restaurant and office bldg. at site. **$100,000.**

●**O., Ashtabula**—PLANT—National Distillers Products Corp., 120 Broadway, New York, N. Y., chemical plant mfg. metallic sodium and chlorine, in State Road industrial area. **$10,000,000.**

●**O., Eastlake** — PLANT — Cleveland Electric Illuminating Co., 75 Public Square, Cleveland, power plant on 45 acre tract along Lake Erie, near mouth of Chagrin River. **$20,030,000.**

O., Marion — TANKS — Central Soya, Inc., 300 Fort Wayne Bank, Fort Wayne, Ind., concrete storage tanks with 500,000 bu. capacity.

O., Newark—BAKERY PLANT—Omar, Inc., 1913 Harney St., Omaha, Neb., bakery plant.

Okla., Oklahoma City—PLANT—Claude Ray Millwork Sales Co., 1621 N. E. 23 St., sash, door and millwork plant, N. E. 44 and Santa Fe Sts. Over **$100,000.**

Okla., Oklahoma City—PLANT—Mackinburg Duncan Co., 130 N. W. 23 St., plant Approx. **$250,000.**

Okla., Oklahoma City—PLANT—Oklahoma Natural Gas Co., 401 N. Harvey St., pipe processing plant. Approx. **$100,000.** W. R. Kubsta, c/o owner, engr.

●**S. C., Charleston**—POWER PLANT—South Carolina Power Co., 141 Meeting St., 2 addtl. power plant units, 1 1950 **$4,300,000.**, other 1951 **$5,000,000.** Gilbert Assoc., Inc., 412 Washington St., Reading, Pa., engr.

●**Tex., Andrews**—PLANT—Phillips Petroleum Co. and Fullerton Oil Co., Bartlesville, Okla., 2nd gasoline plant for flare gas. **$2,225,000.**

Tex., Dallas—SHOP—Ed Maher, Inc., 420 N. Harwood St., plans by John D. Danna, 2618

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Cedar Springs Rd., masonry auto shop. $125,000. CD 10/25/45—ENR 11/8/45.

Tex., Dallas — PLANT — Potter Art Iron Studios, 2927 N. Henderson St., expanding, remodeling ornamental ironworks plant. **$100,000.**

Tex., Dallas—CHEMICAL PLANT—Thompson-Hayward Chemical Co. of Texas, 2026 Singleton Bldg., chemical mfg. plant. Approx. **$400,000.**

Tex., Grapeland — PLANT — Geier-Jackson, Inc., Grapeland, doubling capacity cycling natural gasoline-refining plant. **$350,000.**

Tex., Houston — PLANT — Lester Goodson Pontiac Co., 1117 San Jacinto St., masonry auto plant, service, storage, display, shops. **$275,000.**

Tex., Houston — WAREHOUSE, etc. — Gulf Canal Lines, Inc., M & M Bldg., warehouse, **$250,000;** office, **$250,000,** on Ship Channel.

Tex., Houston—WAREHOUSE, etc.—Iverson Supply Co., 216 W. 2 St., Tulsa, Okla., plans by Addis E. Noonan Assoc., American Hospital & Life Bldg., San Antonio, masonry warehouse and plant, 66 St. and Supply Row. **$200,000.**

Tex., Houston—WAREHOUSE, etc.—Union City Transfer Co., 2101 Nance St., warehouse and parking yards, 10 acre tract purchased in Burchfield Industrial Dist. **$100,000.**

●**Tex., Port Arthur**—STILLS—Gulf Oil Corp., Port Arthur, 3 atmospheric-vacuum topping stills. **$8,000,000.** CD 5/1/47—ENR 5/15/47.

Tex., Victoria — POWER PLANT—Central Power & Light Co., 129 N. Chaparral St., Corpus Christi, electric power plant and distr. facilities expans. **$750,000.**

Tex., Wichita Falls—PLANT—Holin Trust Co., Wichita Falls, gas repressuring plant. **$350,000.**

Tex., Wichita Falls—MOTOR LODGE FACILITIES—Grace Bros. & R. L. Mattingly, 1306 Scott St., plans by **J. A. Neatherlin,** archt. and engr., 440 Nacol Bldg., 2 story, 184x224 ft., brick veneer motor lodge facilities, various shop units, central heating and cooling sys. **$160,000.**

●**Wash., Vancouver**—PLANT—Buffalo Electro-Chemical Co., River Rd. and Sawyer Ave., Tonawanda, N. Y., plant. Approx. **$1,000,000.**

Wis., Menomonee Falls—FACTORY—Stolper Steel Products Co., 3258 W. Fond du Lac Ave., Milwaukee, Zone 10, plans by Grassold & Johnson, 734 N. Jefferson St., Milwaukee, Zone 2, 1 story, 290x420 ft., steel, brick factory, concrete fdn.

●**Alaska, Fairbanks** — WAREHOUSE, etc. — Pacific Alaska Development Co., c/o Gerald Field, archt., Jones Bldg., Seattle, Wash., warehouse and 300 housing units. **$10,000,000.**

Alta., Edmonton — REFINERY — McColl-Frontenac Oil Co., J. M. Pritchard, pres., 360 St. James St. W., Montreal Que., oil refinery on outskirts of the city. Approx. **$10,000,000.**

Alta., Red Deer — PLANT — Alberta Pulp Mills, Ltd., Red Deer, pulp plant. Over **$250,000.**

B. C., Summerland — PACKING HOUSE — Summerland Co-operative Growers, Summerland, rein.-con. packing house addn., incl. offices and cafeteria, **$198,000.**

Man., Winnipeg—FACTORY—Western Auto & Truck Body Works, 702 Broadway Ave., 100 x 300 ft., brick factory, Pembina Hy. Approx. **$250,000.**

N. S., Little River—STORAGE PLANT—Syndicate, c/o Village Clerk, Little River, cold storage plant providing space for 2 million fish. **$300,000.**

Ont., Chatham—PLANT—Weaver Industries, Ltd., Chatham, reconstructing plant, mfg. hydraulic jacks, etc. **$100,000.**

Ont., Hamilton—PLANT—Canada Dry Ltd., 153 Shelbourne St., Toronto, plant. **$350,000.**

Ont., Ottawa — WAREHOUSE, etc.—Fournier Van & Storage, Ltd., 117 Besserer St., warehouse and garage. **$100,000.**

Ont., Toronto — PLANT — Star Printing & Publishing Co. Ltd., 80 King St. W., plant, on Harbour site. Over **$500,000.**

●**Que., Cap de la Madeleine**—PLANT IMPRVS. —Norton Co., C. H. Wostle, genl. mgr., Cap de la Madeleine, plant imprvs. Approx. **$1,000,000.**

Que., Cartierville (Postal Dist. Montreal)—PLANT—Electric Boat Co. Ltd., Cartierville, aircraft mfg. plant extens. **$150,000.**

Que., Drummondville—PLANT—Owner, c/o Chamber of Commerce, A. Toupin, pres., plant. Approx. **$175,000.**

Que., Hull—PLANT—M. Mailman, c/o Ottawa Car & Aircraft Co., Ltd., Albert St., Ottawa, Ont., plant reconstruction. **$100,000.**

Que., Montreal—WAREHOUSE—Grinnel Co. of Canada Ltd., 700 Beaumont Ave., plans by Luke Little & Mace, 1410 Guy St., 1 story, 40x179 ft. rein.-conc., steel, brick warehouse addn. **$150,000.** Archambault & Roy, 6370 First Ave., engr.

Que., Montreal East (Postal Dist. Montreal)—PLANT—Standard Chemical Co., 5070 St. Ambroise St., Montreal, plant mfg. ethylene glycol anti freeze. Over **$150,000.**

Que., St. Adrien De Ham—MILL—International Asbestos Co. Ltd., 66 Wellington St. W., Sherbrooke, 1,000 ton mill. Approx. **$950,000.**

Que., Sherbrooke—PLANT—Quebec Rayon Mills, Ltd., 93 Frontenac St., plant adn. **$250,000.**

The same

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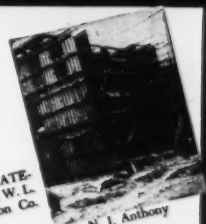
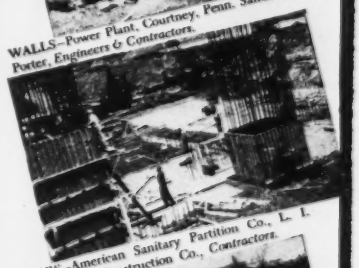


FLOOD WALL GATEWAY—Newport, Ky. W. L. Johnson Construction Co.

CLARIFLOCCULATOR—Whippany, N. J. Anthony Lewis, Inc., Maplewood, N. J., Contractors



WALLS—Power Plant, Courtney, Penn. Sanderson & Porter, Engineers & Contractors.

FLOORS—American Sanitary Partition Co., L. I. City, Cardinal Construction Co., Contractors.

Here are only a few of many different types of jobs for which the same unit can be used. The flexibility of Atlas Speed Form units makes possible an infinite variety of combinations. The sturdiness of the form results in many re-uses, makes form costs almost nominal. The engineered design produces 25% to 50% labor savings.

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Engineering Data—Estimates

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Garden City 7-5451

Diamond Core Drilling

CORE BORINGS for Foundations, Dams, Bridges and all Heavy Structures GROUT HOLES

Tinney Drilling Co.

Grafton, W. Va.

Que., Valleyfield—PLANT—Asten Hill, Ltd., Valleyfield, plant addn. mfg. asbestos felts for paper machines. **$200,000.**

Sask., Saskatoon — OIL REFINERY — Sask. Power Comn., Regina, oil refinery. Over **$350,000.**

UNCLASSIFIED

Arkansas — RURAL DISTRIBUTION LINE —Ozarks Rural Electric Co-operative Corp., Fayetteville, 199 mi. rural distr. lines to serve 604 customers, Washington Co., Ark-24. **$605,000.** Frank Horton & Co., Lamar, Mo., consult. engrs. CD 12/15—ENR 12/30.

● **Colo., Denver** — RACETRACK — Roy D. Barnes, pres. and Gene E. Shaw, E. & C. Bldg., racetrack, 17,500 car parking space, clubhouse, stables, concessions, etc. **$1,500,000.**

● **Fla., Ft. Pierce**—RECREATION CENTER—City, inside and outside General Recreation Center. **$2,500,000.** C. E. Swank, city mgr. and engr.

Fla., Miami—STADIUM—City, O. P. Hart, mgr., 22,000 seat addn., Orange Bowl Stadium. **$700,000.**

Georgia—RURAL DISTRIBUTION LINES —Lamar Electric Membership Corp., Barnesville, 300 mi. rural distr. lines and sys. imprvs., Lamar Co. **$480,000.** J. B. McCrary Eng. Corp., 22 Marietta St. Bldg., Atlanta, consult engr. CD 12/17.

Kansas—RURAL DISTRIBUTION LINES—Norton-Decatur Co-operative Electric Co., Norton, 257.2 mi. rural distr. lines, Norton Co. **$240,000.** Raymond H. Reed & Co., Columbus, Neb., engrs.

● **Louisiana-Arkansas-Illinois** — GAS PIPELINE—Mississippi River Fuel Corp., W. G. Marbury, vice pres. and genl. mgr., 407 N. 8 St., St. Louis 1, Mo., 26 in. natural gas pipeline from Perryville La. to Joliet or Genesee, Ill. **$92,000,000.**

La., Ponchatoula—NATURAL GAS SYSTEM—City, City Hall, voted bonds, natural gas sys. **$120,000.**

Maryland—RURAL DISTRIBUTION LINE —Choptank Electric Co-operative, Denton, 155 mi. rural distr. line, sys. imprs., 13 mi. new tie lines, two-way radio communication sys., completed constr. with prior REA approval consisting 145 mi. rural dist. line, Caroline Co. **$1,215,000.**

Michigan—RURAL DISTRIBUTION LINE —Ontonagon County Rural Electric Assn., Ontonagon, 19 mi. rural distr. line, sys. imprvs. and completion of previously approved constr., Ontonagon Co. **$165,000.**

Minnesota — RURAL DISTRIBUTION LINES—North Pine Electric Co-operative, Finlayson, plans by United Eng. Service, 600 Kasota Bldg., Minneapolis, 120 mi. rural distr. line in Pine Co., sys. imprvs. incl. 15 mi. new tie lines, for headquarters facilities and 2-way radio communication sys. **$315,000.** CD 9/24/47—ENR 10/16/47.

● **Minn., St. Louis Park**—BALL PARK and STADIUM—Minneapolis Millers (American Assn. Ball Club), 3048 Nicollet Ave., M. Hessian, treas., ball park and stadium to seat 17,500, Wayzata Blvd. and Highway 100. **$1,000,000.**

Missouri and Iowa—RURAL DISTRIBUTION LINES—Nodaway-Worth Electric Co-operative, Maryville, Mo., rural distr. lines, Nodaway, Worth, Gentry, Holt and Harrison Counties, Mo. and Taylor, Page, Ringgold Counties, Ia. **$850,000.** Frank Horton & Co., Lamar, Mo., consult. engrs. CD 12/2—ENR 12/30.

Mo., University City (St. Louis 5, P. O.—STADIUM—St. Louis Archdiocese of the Catholic Church, c/o Archbishop Joseph E. Ritter, 4510 Lindell Blvd., St. Louis, Zone 8, stadium for high school athletic field on 13 acre tract, Olive Blvd. and Pennsylvania Ave.

Nebraska—RURAL DISTRIBUTION LINES —Twin Valleys Electric Membership Assoc., Cambridge, 333 mi. rural distr. lines, Furnas Co. **$338,000.** Flora Eng. Co., 1717 E. Colfax Ave., Denver, Colo., engr.

North Carolina—RURAL DISTRIBUTION LINES—French Broad Electric Membership Corp., Marshall, rural distr. lines, exten. to 900 homes, renovate office bldg., construct warehouse, Madison Co. **$334,250.** B. O. Vannort, 218 W. 2 St., Charlotte, engr.

North Carolina—RURAL DISTRIBUTION LINES—Pamlico Beaufort Electric Membership, Grantsboro, rural distr. lines, extend. to 350 homes and building office. **$223,000.**

North Dakota—RURAL DISTRIBUTION LINES—R.S.R. Electric Co-operative, Milnor, 533 mi. rural distr. lines, sys. imprvs., completion previously approved, constr., Sargent Co. **$920,000.** Ulteig Eng. Corp., Fargo, consult. engr.

North Dakota—RURAL DISTRIBUTION LINES—West Plains Electric, Co-operative Inc., Dickinson, Sect. C, 252 mi. rural distr. lines, **$252,000;** Sect. D, 598 mi. rural distr. lines, **$598,000,** both Stark Co. Ulteig Eng. Corp., 1114½ Front St., Fargo, engr. CD 8/23—ENR 9/9.

● **Oklahoma**—RURAL DISTRIBUTION LINES —Cotton Electric Co-operative, Walters, 244 mi. rural distr. lines, Cotton Co. **$1,250,000.** F. W. Morgan, Belton, Mo., consult. engr. CD 12/17.—ENR 12/30.

Oklahoma — RURAL DISTRIBUTION LINES—Harmon Electric Assoc., Hollis, rural distr. lines, Harmon Co. **$240,000.**

Okla., McAlester—COAL MINE DEVELOPMENT—Sheffield Steel Corp., Industrial Rd., Houston, Tex., coal mine development, incl. sinking shafts, elevators, walls and ceilings bracing, coal car lines etc. **$500,000.**

Okla., Stillwater—ELECTRIC EXTENS.—City, voted bonds, electric distr. sys. **$290,000;** cooling tower and converting existing electric generators, **$148,000.** George W. Bandeleir, city engr. CD 11/19.

●**Pa., Erie**—COAL DUMP OPERATION, etc.—Pennsylvania R.R. Co., J. L. Gressitt, ch. engr., Broad St. Station Bldg., 1617 Pennsylvania Blvd., Phila., Zone 4, electrified coal dump operation in Erie harbor incl. constructing docks and loading structures for lake vessels. **$6,000,000.**

South Carolina—RURAL DISTRIBUTION LINES—Pee Dee Electric Co-operative, Darlington, 261 mi. rural distr. lines, Darlington Co. Approx. **$300,000.** Southern Eng. Co., 699 Spring St. N. W., Atlanta, Ga., consult. engr. CD 8/23—ENR 9/9.

Tennessee—RURAL DISTRIBUTION LINES—Appalachian Electric Co-operative, Jefferson City, 253 mi. rural distr. lines and sys. imprvs., Jefferson Co. Over **$300,000.** Pat M. Sullivan, Stahlman Bldg., Nashville, consult. engr. CD 12/15—ENR 12/30.

Tennessee—RURAL DISTRIBUTION LINES—Fort Loudon Electric Corp., Madisonville, 179 mi. rural distr. lines and sys. imprvs., Loudon Co. Over **$350,000.** A. D. McWhorter, Jr., 124½ Union Ave., Nashville, consult. engr. CD 12/17—ENR **12/30.**

●**Texas and Minnesota**—GAS LINES—Northern Natural Gas Co., Aquila Court, Omaha, Neb., 28½ mi. 24 in. pipe, 17 mi. 20 in. natural gas lines, 7 compressor units with total 11,200 hp. for line between Texas and St. Paul, Minn. area. **$4,31 0,000.**

Texas—RURAL DISTRIBUTION LINES—Comanche County Electric Co-operative Assn., Comanche, 521 mi. rural distr. lines, sys. imprvs., 30 mi. new tie line, completing constr. with prior REA approval consisting of 49 mi. distr. line, Comanche Co. **$830,000.** CD 11/17—ENR 12/16.

●**Texas**—RURAL DISTRIBUTION LINES—Lower Colorado River Electric Co-operative, Giddings, addnl. rural distr. lines and sys. imprvs. Lee Co. **$1,742,000.** CD 1/7—ENR 1/22.

Texas—RURAL DISTRIBUTION LINES—Robertson Electric Co-operative, Franklin, rural distr. lines, Robertson Co. **$500,000.**

●**Texas**—OIL PIPELINE—Texas Pipe Line Co., Texas Bldg., Houston, 187 mi. 12 in. crude oil pipeline between Corsicana and Wichita Falls, Navarro Co. **$3,740,000.**

Tex., Colorado City—DAM—Texas Electric Service Co., Electric Bldg., Fort Worth, earth and concrete dam on Morgan Creek, **$800,000** CD 2/28/46—ENR 5/2/46, under Industrial Bldgs.

Tex., Corpus Christi—PARK—Neuces Co., George Prowse, judge, Courthouse, voted bonds, Padre Island Park Playgrounds and recreation center developing **$300,000.** Jas. L. Gubbels, 2515 Woodbridge Dr., Austin, consult. engr. J. R. Laurence, co. engr. CD 11/23.

Tex., Waco—SWIMMING POOLS—City, Dr. J. E. Hawkins, mayor, 3 municipal rein.-con. outdoor swimming pools, 1 each Bells Park, N. 4 St. and Rhodes-Mills Park. **$200,000.**

●**Wash., Seattle** — STADIUM — University of Washington, 15 Ave. N. E. and E. 40 St., Zone 5, plans by J. P. Jones & L. W. Bindon, Hoge Bldg., Zone 4, double-decking football stadium. **$1,500,000.** CD 10/21—ENR 11/4.

†**Wash., Spokane**—SPRINKLER SYSTEMS—Pub. Wks. Office, Naval Supply Depot, Spokane, converting sprinkler sys., Naval Supply Depot, Spec. 21089. Plans deposit $10.

Wis., Port Edwards—BATHHOUSE, etc.—Village, plans by Donn Hougen, Wisconsin Rapids, bathhouse and swimming pool. **$135,600.**

●†**Alaska**—REHABILITATION RAILROAD—Alaska Railroad Dpt. Interior, Anchorage, rehabilitation Portage Seward section of railroad. **$12,000,000.**

Alta., Edmonton—FIRE ALARM SYSTEM—Municipality, fire alarm sys. rehabilitation, incl. fire alarm bldg. **$177,861.** A. W. Haddon, city engr.

B. C., Kimberley — ARENA—Municipality, arena, **$200,000.**

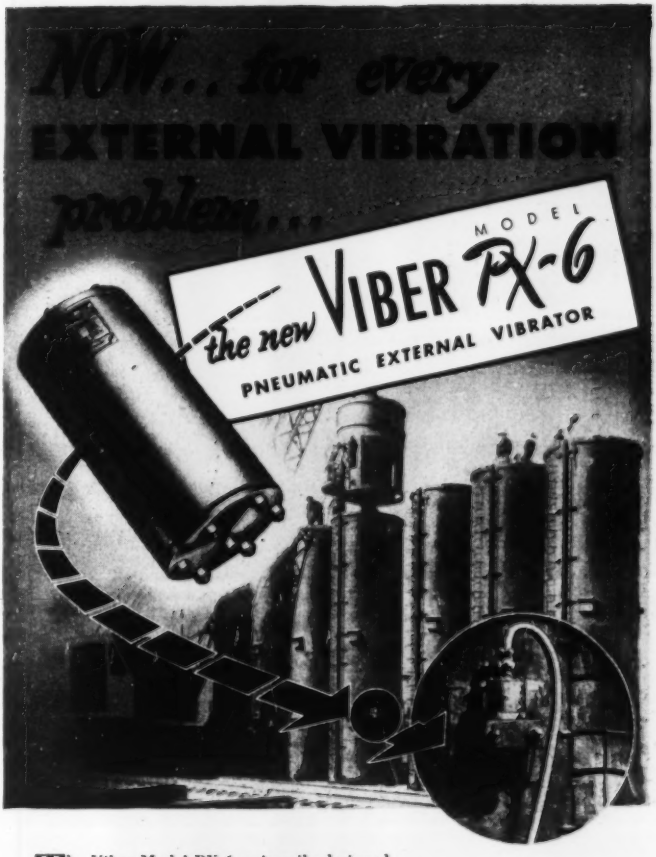
B. C., Rossland — ARENA—Municipality, sports arena, **$100,000.**

Ont., Maple—RACE TRACK—J. Lathers, c/o J. M. MacDonald, Maple, race track, Steel's Corners, **$100,000.**

Ont., Toronto — PARK — Municipality, 10 acre sq. park, west of city hall. **$300,000.** M. Stewart, city engr.

Que., Arvida—SWIMMING POOL—Municipality, swimming pool, gymnasium, etc., on Davis Square, **$100,000.** R. Lemieux, City Hall, engr.

Que., Three Rivers—MARINE TERMINAL—McColl Frontenac Ltd., 2510 Notre Dame St. E., Montreal, marine terminal distr. centre, **$100,000.**



The Viber Model PX-6, primarily designed for concrete pipe manufacture, has since proven equally effective in other fields such as in the manufacture of concrete products, and in the handling of dry materials.

5 Reasons for Outstanding Versatility in the PX-6

1. Operates at desired amplitude over a wide range.
2. Operates at desired speed over a wide range.
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SPECIFICATIONS

SIZE: Diameter 5½ inches; length 12 inches.

NET WEIGHT: 40 pounds.

ECCENTRIC WEIGHT: Available over a wide range of sizes.

VIBRATING SPEED: Desired speeds are obtained by regulation of the air pressure.

POWER: Dependable vane type pneumatic motor.

COOLING: Cooled by circulation of exhaust air through the housings.

Mounting Clamp, Carrying Handle
Available as extra equipment.

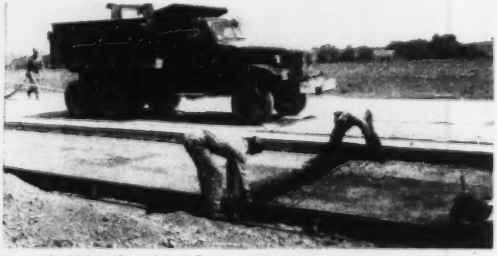
For complete details of the VIBER Model PX-6 Pneumatic *External* Vibrator—or assistance on any concrete placement problem involving *internal* vibration—*write or wire:*

VIBER CO. CONCRETE VIBRATORS
EST. 1931 Dept. 20 726 South Flower Street • Burbank, California

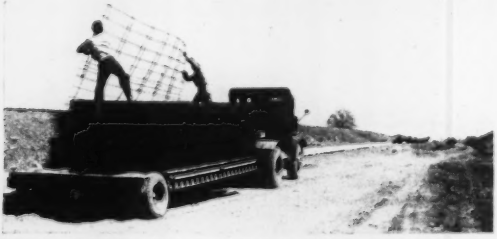
Relocating Part of U.S. Route 422

The dust flies as truck empties load into skip. To keep ahead of paving operations, newly arrived dowel units are unloaded from truck at right.

Scraper wagon and roller lead the parade as grading swings into high gear.



Placing Bethlehem Dowel Unit. For use either as expansion joint or contraction joint, this unit keeps dowels in near-perfect horizontal and vertical alignment.



Bethlehem Hinged Bar Mats, popular with road builders because of their remarkable ease of handling and installation, are shown being delivered to job.

Benjamin H. Fager (center), foreman for C. W. Good, Inc., with Wade D. Brandt (left), and M. H. Mosser, inspectors, Pa. Dept. of Highways.

To cope with fast-growing traffic conditions on Route 422, express highway from Philadelphia to Harrisburg, Pa., approximately five miles of relocation were authorized recently in the Robesonia-Sinking Springs area. The new highway is three lanes in width, and includes five reinforced concrete bridges. The accompanying photographs show construction activity being carried out by C. W. Good, Inc., Lancaster, Pa. Reinforcing bars, structural steel, bar mats, dowel units and guard rail were supplied by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand • Pipe
Hollow Drill Steel • Spikes • Bolts and Nuts
Timber Bridge Hardware • Tie-Rods
Sheet and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

CONSTRUCTION REPORTS Second Section

Third Section Construction
Reports on Page 166

WATER SUPPLY

BIDS ASKED

January 24

Md., Towson—Bd. Comrs. Baltimore Co. Court House, 1,480 lin. ft. 6 and 8 in. water-mains, 1,655 lin. ft. 6 and 8 in. vitr. tile sewers, 2,145 lin. ft. 15- to 66-in. rein.-con. pipe valves, fire hydrants, manholes, house connections, inlets, appurtenances. Contr. 153 DS&W. Plans deposit $5. Wm. F. Neale, Court House, ch. engr.

January 25

N. Y., New York—Comr. Water Supply, Gas & Electricity, Municipal Bldg., Zone 7, water-mains, appurtenances, Lithuania, 20, 50, 56, and 82 Aves., 80, 166, 185, 231, 254 and 260 Sts., 65 Dr. and Ellwell Crescent, Queens Boro. Plans deposit $1.

January 26

Md., Baltimore—Mayor & City Council, City Hall, special piping, appurtenances for Liberty Rd. Montebello Tunnel, inc., 450 lin. ft. 60 in. and 40 lin. ft. 7 ft. steel plant gunite lined concrete encased pipe, 500 lin. ft. 48 in. concrete pipe, 1,650 lin. ft. 4- to 24-in. c. i. pipe, etc. Plans deposit $10 Leon Small, city water engr. CD 7/30—ENR 8/5.

Pa., Phila.—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, water lines, Phila. State Hospital. Approx. $28,000. Jack S. Steele Co., 1416 Chestnut St., engr.

January 27

Mich., Detroit—State Hy. Dpt., Lansing, water sys., alterations, storm sewer, John C. Lodge Expressway, from Holden to Lothrop Aves., UI 82-127, CIO. Plans deposit $3. M. H. Frimodig, hy. engr.

N. Y., Dryden—At office L. H. Gridley, village clk, Dryden, WW addns., incl. constructing well house and water pipelines addns. Plans deposit $10. William S. Lozier Co., 10 Gibbs St., Rochester, Zone 4, engr. CD 12/21/44—ENR 1/11/45.

O., Akron—Dpt. Pub. Serv., M. L. Davis, dir., Municipal Bldg., Contr. 411, pump station rehabilitation at city's water sys. near Kent. Plans deposit $25; Contr. 415, installing electrical sys. at city's Cuyahoga River Pumping Station, near Kent. Plans deposit $10. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York, N. Y., engrs. CD 1/6—ENR 1/13, under LB.

†Alaska, Fairbanks—Alaska Railroad, Dpt. Interior, Anchorage, 50,000 gal. elevated steel water tank.

January 28

Ont., Ottawa—Chairman Rd. Control, Ottawa, 750,000 gal. steel elevated storage tank, for municipality. W. E. MacDonald, 202 Transportation Bldg., engr.

January 31

Tex., Houston—City, M. R. Westerman, secy., 7 mi. 10- to 18-in. c. i. waterlines for the Heights and Northeast Water Plants. $345,000. CD 6/30/44—ENR 7/13/44.

LOW BIDDERS

Ga., Calhoun—City, Calhoun, rejected bids Dec. 15, WW imprvs. LB. **$317,848.** CD 12/22—ENR 12/30, under LB.

†N. M., Los Alamos—U. S. Atomic Energy Comm., Santa Fe, Dec. 29, fire protection and watermain imprvs. Inv. 291-49-74, from John A. Woodward, Burbank, Calif., **$45,915.** Est. $38,251. CD 12/15.

Va., Warsaw—Town, Jan. 5, water supply and distr. sys., Item 1, from Luck Constr. Co., Rothesay Rd., Richmond, **$79,075.** Approx. $80,000. Warren C. Perrow, Sauer Bldg., Richmond, engr.

CONTRACTS AWARDED

Ind., East Chicago—Bd. Water Works Trustees, A. G. Vinck, supt. Water Works, WW imprvs., 1½ mg. elevated steel storage tanks, to Chicago Bridge & Iron Co., 332 S. Michigan St., Chicago, Ill., **$238,000.** Est. $250,000. Bids 5/25. CD 5/13—ENR 5/20.

N. Y., Huntington Station—Bd. Water Comrs., South Huntington Water Dist., South Side Civic Assoc. Bldg., New York Ave. and W. 18 St., 1 m. g. reservoir, to Horn Constr. Co., 1776 Broadway, New York, Zone 19, **$217,000;** well to C. W. Lauman Co., 50 Church St., New York, Zone 7, **$57,919.** Bids 12/10. CD 11/24—ENR 12/2.

S. C., Walhalla—Town, WW and sanitary sewer imprvs., to Peden Constr. Co., Greenville, **$173,882.** Bids 1/6. CD 12/2—ENR 12/9.

Tex., Fort Worth—City, W. O. Jones, mgr., Sedimentation Basin 3, to Glade-Friedman-Byrne Constr. Co., Century Bldg., **$350,000.** CD 12/15—ENR 1/7.

Wash., Enthat—Town, Town Hall, 5,950 ft. 6- to 10-in. steel or cement asbestos pipe with fittings for water sys. exten., to H. D. Fowler Co., Inc., P. O. Box 3084, Seattle, **$39,737.** Bids 11/26. CD 11/19.

Wash., Grandview—City, City Hall, furnishing, erecting 500,000 gal. steel storage tank, to American Pipe & Constr. Co., 518 N. E. Columbia Blvd., Portland, Ore., **$74,862.** Est. over $28,000. Bids 1/4. CD 12/28.

Wis., Monroe—Bd. Water Comrs., Monroe, elevated tank, to Pittsburgh-Des Moines Steel Co., 38 S. Dearborn St., Chicago, Ill. **$61,300.** Ward & Strand, Madison, engrs. CD 6/16/44—ENR 7/13/44.

SEWERS, WASTE DISPOSAL

BIDS ASKED

January 26

Pa., Phila.—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, storm and sanitary sewers, Phila. State Hospital. $100,000. Jack S. Steele Co., 1416 Chestnut St., engr. CD 12/20—ENR 1/7.

January 26

Ont., Barriefield—Secretary Canadian Commercial Corp., 70 Lyon St., Ottawa, sewage disposal plant, sewer extens., Military Camp, Tender Reg. 268. Approx. $100,000. Plans

January 28

Calif., Sacramento—City, City Hall, sewers in Colonial Acres and Colonial Acres 2. Over $50,000. Plans deposit $10. Fred Klaus, City Hall, city engr.

Pa., Highspire—Highspire Sewer Auth., c/o Joseph Lewis, chn., Highspire, sewer lines, sewage treatment plant. $250,000. CD 12/13—ENR 12/16, under LB.

February 1

Calif., Redwood City—San Mateo Co., Courthouse, Crystal Springs Rd. Outfall Sewer, $108,000. Plans deposit $10. Wilsey & Co., Inc., 1126 Broadway, Burlingame, engrs.

February 2

Tex., San Benito—City, sewage disposal plant, $125,000; sanitary sewerage sys. extens., imprvs. to existing lines, $175,000. Sigler, Clark & Winston, Box 428, Weslaco, engrs. CD 9/22—ENR 10/14.

February 21

●Mich., Ann Arbor—City, Ann Arbor, Contrs. 1, 3 and 4, sewage treatment plant addns., Total cost $1,750,000. Plan deposit $20. Drury, McNamee & Porter, Ann Arbor, engrs. CD 11/13/44—ENR 11/30/44.

February 28

●Mich., Ann Arbor—City, Ann Arbor, Conts. 2, sewage treatment plant addns. Total cost $1,750,000. Plans deposit $20. Drury, McNamee & Porter, Ann Arbor, engrs. CD 11/13—ENR 11/30/44.

LOW BIDDERS

●D. C., Wash.—Govt. Dist. of Columbia, Director of Sanitary Eng., District Bldg., 14 St. and Pennsylvania Ave. N. W., Zone 4, Jan. 13, preliminary sedimentation and sludge digestion tanks, sewage treatment plant extens., Blue Plains, from Progressive Builders, Inc., Crescent Blvd. and Norwood Ave., Pennsauken, N. J., Schedule 4A, **$482,101;** Schedule 2A, **$850,362.** CD 12/27.

Ind., Butlerville—State of Indiana, P. Wks. & Supply Div., O. F. Heslar, dir., 404 State House, Indianapolis, sewage treatment plant, sewer imprvs., from Winslow & Light, Salem, **$211,700.** Est. $250,000. CD 12/21—ENR 12/28.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $25,000; other public works $50,000; industrial buildings $68,000; other buildings $250,000.

Classes of Construction

(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	
Earthwork, Waterways	Industrial Buildings

Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

† Federal Government
● Project of $1,000,000 or over.
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

N. J., Mt. Holly—Mt. Holly Sewage Auth., Mt. Holly, Jan. 6, sewage disposal sys., Contr. 1, sewage treatment works Div. A pumping station, from Construction Corp. of Penna., 2237 Bryn Mawr Ave., Phila., Pa., **$208,581***;** Contr. 3, sanitary sewers, service sewers not incl. steam crossings and Contr. 10, sewers from Canning & Cestone, 127 Franklin Terrace, Maplewood, **$113,437***;** Contr. 11, steam crossings from Chester S. Moses, Edgewater Lane, Edgewater Park, **$58,800.** CD 11/30—ENR 12/2.

Tex., Lubbock—City, Jan. 7, sewage treatment plant, incl. earth reservoir, operating equip., grading, metal, clay and concrete piping, pump house exten., etc., from Cullum & Hodgson, 1114 Texas Ave., **$165,252.** H. N. Roberts & Assoc., 1310 Ave. Q, engrs.

CONTRACTS AWARDED

●Neb., Omaha—City, South Omaha Sewer, to Michigan Sewer Constr. Co., 21720 W. 8 Mile Rd. Detroit, Mich., **$2,074,531.** Bids 1/4. CD 1/7—ENR 1/13, under LB.

Pa., Quakertown—Quakertown Boro Council, Quakertown, interceptor sewer manholes and sewage pump, to Tri County Constructors, Hilch School Rd. and Harrison Ave., Elkins Park, **$75,800.** Bids 12/29. Albright & Friel, Inc., 1528 Walnut St., Phila., engrs.

Tex., Raymondville—City, addnl. storm sewers, open drainage ditch, to Brown & Root, Inc., P.O. Box 3, Houston, **$125,000.**

BRIDGES

BIDS ASKED

February 1

Massachusetts—Mystic River Bridge Authority, 6 Beacon St., Boston, Zone 8, toll booths and toll registering equip. accessories for 14 traffic lanes at Toll Plaza and Administration Office. Contr. 9-B. Plans deposit $7.50. Charles A. Maguire & Assoc., 46 Cornhill, Boston, Zone 8, and J. E. Greiner Co., 1201 St. Paul St., Baltimore 2, Md., engrs.; adv. ENR 1/20. CD 3/10/47—ENR 3/20/47.

February 8

†Arkansas—U. S. Eng., P. O. Box 97, Memphis, t., Tenn., placing approx. 910,000 cu. yd. earth work, constr. wood and steel bridge in Mud Slough Drainage Dist., about 1½ mi. below west end of Harahan Bridge, Greene Co., Serial No. Eng-4-041-49-92.

SOON LETS CONTRACT

New Jersey—The Central R. R. Co. of New Jersey, S. L. Mapes, ch. engr., Jersey City Terminal, Jersey City, Zone 2, soon lets contract removing portion Bridge 177, Newark and New York Branch, over Hackensack River between Kearny and Jersey City. Plans deposit $15.

LOW●BIDDERS

●New York—Bertram D. Tallamy, supt. Dpt. P. Wks., Albany, Jan. 12, 0.24 mi. Bowerman Road (Oatka Creek Bridge), FA. SS 49-1 and bridge 0.25 mi. North Hamlin Rd. FA. SS. 49-2, Monroe Co. from Potter-De Witt Corp., Pavilion, **$101,963** est. $110,000 and **$91,172** est $99,000 respectively***bridge 0.09 mi. State St. Wellsville Village, County Rd. 28, FA. SS 49-3, Allegany Co., from Howard & Sprague, 656 State St., Binghamton, **$227,801** est. $231,000***separation of grades of the Chester Village S. H. 1802 with Erie R. R. Co. 0.17 mi. FG. RC 49-2, Orange Co., from Richard Hopkins Co., 44 Pearl St. and Leiddenville Rd., Albany, **$235,711** est. $242,000***Brooklyn-Queens Expressway (Contr. 2), alterations to Meeker Avenue Viaduct, 0.09 mi. FA-BQE. 49-1, Kings Co., from Horn Constr. Co. Inc., 1776 Broadway, New York, **$134,843** est. $140,000***0.31 mi. Nyack Turnpike, S. H. 91, separation of grades of Erie-Skaitsburg-Sebago Lake, Pt. 1, FAGM, RC 49-3, FAGM, SH 49-1, Rockland Co., from Arthur A. Concrete Co., Inc., Cheatnut St., Suffern, **$354,664,** est. $360,000***0.28 mi. Bronx River Parkway-South Exten. (Gunhill Rd., BRP, 49-1, Bronx Co., from Lawrence J. Rice, Inc., 30 Deepdon Rd., Forest Hills, **$1,318,973** est. $1,350,000. Received no bids Jan. 12, 0.62 mi. Cross Bronx Expressway, FA. CBE. 49-1, Bronx Co., cancelled bids to have been opened Jan. 12, Cross County Parkway to Hutchinson River Parkway (Wartburg Connection), CCP, 49-1, Westchester Co., will re-advertise. CD 12/22—ENR 12/30.

●Pa., Pittsburgh—Comr. Alleghany Co. County Office, Jan. 4, Contr. 6, approaches and superstructure, Rankin Bridge over Monongahela River, from The Pavia Co., Verona Rd., Verona, **$1,795,297.** Est. $2,000,000. CD 12/15—ENR 12/23.

Tex., Port Arthur—Jefferson Co., Courthouse, Beaumont, Jan. 7, concrete, steel vehicle bridge and culvert on Proctor St. exten. near here, from Trotti & Thompson, 2940 Crockett St., Beaumont, **$121,148.** CD 12/28, under Earthwork, etc.

Wisconsin and Minnesota—State Hy. Comm., Madison, Wis. and Comr. Hys. State of Minnesota, St. Paul, at office Wisconsin State Hy. Comm., Wis., cancelled bids to have been opened Jan. 18, Hudson interstate bridge, approaches over St. Croix River, U. S. Hy. 12, Contr. 1, Proj. FI 06-5 (6) and FI 06-(7), St. Croix Co., Wis. and Washington Co., Minn. CD 12/22—ENR 12/30.

CONTRACTS AWARDED

Mass., Fall River—City, M. E. Daly, Water Dpt., Bedford St., repair and pave 2,000 ft. causeway, to Sherry Corp., 823 Davol St., **$95,198.** Bids 12/22. CD 1/4—ENR 1/13, under LB.

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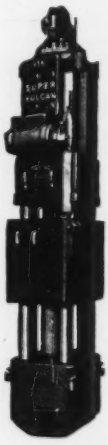

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STREETS AND ROADS

BIDS ASKED

January 24

N. Y., Brooklyn—President Brooklyn Boro, Boro Hall, Zone 2, c. conc. asph. E. 7 E. 98 Sts. Avenue P; c. conc. asph. E. 97 St.; c. conc. asph. repaving Bushwick Ave.; asph. resurf. by heater-method, Bristol, Osborn, Sackman, Cumberland Sts., Dumont, Hopkinson, Pitkin, Saratoga, Shepherd, and Underhill Aves., Park, S. Elliott and St. Francis Pls.

January 28

†**Missouri** — P. Rds. Admin., c/o District Ranger, U. S. Forest Service, Fredericktown, imprv. 3.985 mi. Missouri Forest Hy. Proj. 44-A, St. Francois Co., 36,450 cu. yd. excav., 4,100 cu. yd. gravel or crushed stone surf. course, 160 cu. yd. c. conc. 1,682 lin. ft. galvanized sheet metal culvert pipe-arch. Plans deposit $10.

February 1

†**Nevada**—Pub. Roads Admin., Heroes Memorial Bldg., Carson City, highway constr. in Dalzell Canyon in Toiyabe Natl. Forest Proj. 6-B, Lyon Co. Plans deposit $10. CD 8/4/44 —ENR 8/24/44.

About February 15

Tenn., Chattanooga—City, c/o City Engr. Part 2, Bond Issue Street Paving. $250,000. CD 4/13—ENR 4/29.

Bids Asked

Tex., Austin—City, asph. 20 blocks W. 24 to W. 45 Sts. $50,000. Plans deposit $25. G. Morgan, city engr. CD 5/14/46—ENR 5/30/46.

LOW BIDDERS

Illinois—State Hy. Dpt., Springfield, rejected bids Nov. 16, c. conc. 4.66 mi. State Rt. 67, Morgan Co., L. B. $473,179. CD 11/22—ENR 11/25, under LB.

New York—Bertram D. Tallamy, supt. Dpt. P. Wks., Albany, received no bids Jan. 12, reconstructing 1.49 mi. South Road S.H. 223, FA RC. 49-1, Dutchess Co. CD 12/22—ENR 12/30.

●**Texas**—State Hy. Comn., Austin, Jan. 11, b. conc. 6.249 mi. Hy. FM 441, S. 1098 (1), Wharton Co., from Heldenfels Bros., Rockport, $106,116***single asph. 9.875 mi. Hy. FM 362, S. 1088 (1), Waller Co. from J. W. Perry, 501 Insurance Bldg., San Antonio, $111,360***c. conc. 3.37 mi. Hy. F. 120 (12) and 183, F. 634 (12) and F. 1085 (4), Tarrant Co., from Uvalde Constr. Co., 2400 Uvalde St., Dallas, and J. B. Clardy Constr. Co., 2713 Race St., Fort Worth, $621,698***grading, structures 6.529 mi. Hy. St. 155 F. 852 (6), South Co., from Howard Bros., Madisonville and R. B. Butler, Inc., Bryan, $102,509***grading, culverts, 12.024 mi. Hy. St. 63, F. 632 (3), Newton Co., from Odell Hanson, 4339 Pease St., Houston, $322,461***b. conc. 8.353 mi. Hy. St. 71, F. 417 (10), Fayette Co., from The Jarbet Co., Inc., 812 Insurance Bldg., San Antonio, $309,071*** double b. conc. 26.026 mi. Hy. FM 538 and 784, V. 976-2-1 and V. 1128-1-1, Floyd Co., from Cooper & Woodruff, 903 Irwin-Keasler Bldg., Dallas, $186,718***double b. conc. 10.453 mi. Hy. U. S. 87, F. 371 (2) and F. 303 (2), Coleman Co., from H. L. Butler & Son, 7013 Hillcrest St., Dallas, $293,799***b. conc. 8.594 mi. Hy. FM 777, V. 1109-1-1, Jasper Co., from L. W. Pelphrey Co., Gladewater, $189,165*** returned bids unopened to have been opened Jan. 11, grading, structure 8.498 mi. Martins and Hogans Creek Bridges Hy. St. 149 and Spur 157, F. 650 (2), and (3), Panola and Rusk Counties. CD 12/22—ENR 12/30.

●**Texas**—State Hy. Comn., Austin, Jan. 12, c. conc. 4.875 mi. Grayson Co., from Austin Road Co., Box 1530, Dallas $454,964*** b. conc. 12.742 mi. Hy. U. S. 287, F. 533 (13), Childress and Hardeman Counties, from Cooper-Woodruff, 903 Irwin-Keasler Bldg., Dallas, $272,992***grading 7.354 mi. Hy. St. 73 and FM 823, F. 1052 (9), Jefferson Co. from McWilliams Dredging Co., 860 St. Charles Ave., New Orleans, La., $739,313***b. conc. 6.883 mi. Hy. FM 102, S. 220 (1), Colorado Co., from M.-J. Constr. Co., Beeville, $52,525 ***double b. conc. 13.529 mi. Hy. FM 765, V. 870-4-2, Concho Co., from M. E. Ruby, San Marcos, $74,384***b. conc. 33.321 mi. Hys. FM 789 and 597, V. 967-2 and 2, 1 and 2, Cochran Co., from J. R. Fanning, Lubbock, $235,303*** triple b. conc. 18.479 mi. Hy. U. S. 83, F. 1010 (2), Kerr, Edwards and Real Counties, from T. C. Cage, 6637 W. Commerce St., San Antonio, $184,745. CD 12/29—ENR 12/30.

Tex., Beaumont—Jefferson Co., Beaumont, Jan. 7, c. conc 2¾ mi. Washington Blvd., on Lindburgh Dr. and Sour Lake Rd., from Harrison Eng. Co., Texas City, $125,118. Est. $110,000. Charles L. Davidson, co. engr.

Tex., Houston—Harris Co. Courthouse, Jan. 12, c. conc. portions Old Humble Rd., from Holland Page, Austin Hy., Austin, $96,891. Est. $102,000. Hugo Zapp, co. engr.

CONTRACTS AWARDED

Alabama — State Hy. Dpt., Montgomery, base and bit. 7.5 mi. Little Lagoon to Ala. Point Proj. S-3566 (1), Baldwin Co., to W. L. Cobb Constr. Co., 803 Mobile Rd., Montgomery, $115,318. Bids 12/17. CD 12/2—ENR 12/9.

Indiana—State Hy. Dpt., Indianapolis, c. conc. 5.518 mi. State Rd. 662 from Green River Rd. east of Evansville to State Rd. 261, Vanderburgh Co., to Ryan Constr. Co., 402 Court Bldg., Evansville, $622,995 est. $627,436; bit. resurf. 5.1 mi. State Rds. 312, 6, 12 and 41, Lake Co., to S. G. Hayes & Co., 600 S. Michigan Ave., Chicago, 5, Ill., $149,967 est. $152,844. Bids 1/6, awarded 1/7. CD 12/28.

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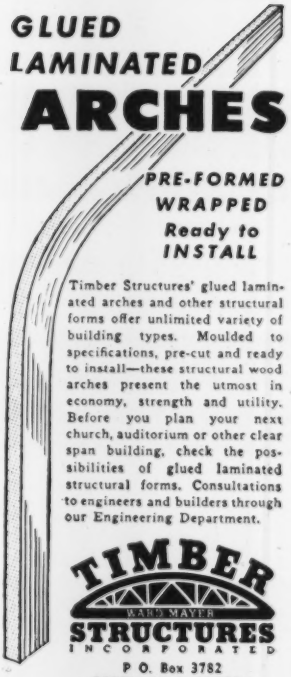

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Maryland — State Hy. Dpt., Baltimore, macad. penetration macad. b. conc. s.395 mi., curve modification, widening at bridge structures, U. S. Rt. 40, beginning at Rohrersville Rd., State Rd. 67 and exten. northeasterly to east limits of Funkstown, Contr. W 391-1-615, Washington Co., to E. D. Plummer & Sons, Chambersb., Pa., **$621,248.** Bids 10/19. CD 10/26—ENR 10/28, under LB.

Miss., Jackson—City, City Hall, paving 3 streets, to Clark Bros. Constr. Co., First Federal Savings & Loan Bldg., **$95,674.** Bids 12/30.

●**New York**—Bureau Contract & Accounts, Albany, grading, drainage, etc. 2.33 mi. Major Deegan Expressway through Van Courtlandt Park to The Delma Eng. Corp., 1208 Wyatt St., New York, **$1,278,000.** Bids 11/24. CD 11/29—ENR 12/2, under LB.

●**New York**—Bureau Contracts & Accounts, Albany, reconstructing 6.01 mi. Route 9N between Westport and Elizabethtown, Essex Co., to Kelleher Corp., Turners Falls, Mass., **$821,928.** 0.84 mi. Court St., Broome Co., to Bero Eng. & Constr. Corp., McKinley Bldg., Buffalo, **$629,560.** Bids 11/24. CD 11/29—ENR 12/2, under LB.

New York—Bureau Contract & Accounts, Albany, reconstructing 1.99 mi. north drive of Erie Blvd. from Teall Ave. east to Thompson Rd., Onondaga Co., to Arute Bros. Inc., New Britain, Conn. **$518,272.** Bids 11/24. CD 11/29—ENR 12/2, under LB.

Tex., Corpus Christi—Baldwin Park, Baldwin and Prescott Sts., asph. streets, own forces. **$70,000.** W. W. McClendon, 127 N. Staples St., engr.

Tex., Corpus Christi—Lamar Park 2, Santa Fe and Almeda Sts., asph. water and sanitary sewer lines, own forces. **$76,000.**

Tex., Houston — Brykerwood Development Co., c/o J. A. Hamilton, Brykerwood Addn., streets, water and sanitary sewer lines, on 25 acre plot, east side of Wirt Rd., own forces. **$70,000.**

Tex., Raymondville — City, curbs, gutters, asph. streets, to Brown & Root, Inc., P.O. Box 3, Houston, **$140,000.**

EARTHWORK, WATERWAYS

BIDS ASKED

January 25

Massachusetts — Commonwealth of Mass., Wm. F. Callahan, comr. P. Wks., 100 Nashua St., Boston, shore protection, Oak Bluffs, Marthas Vineyard. Plans deposit $2.

January 26

B. C., Port Alberni—Secy. c/o Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., bulkhead floats. Approx. $60,000. R. Blais, c/o owner, engr.

N. S., East Ferry—Secy. c/o Dpt. P. Wks., Hunter Bldg., Dpt. P. Wks., Ottawa, Ont., breakwater replacement. Approx. $60,000. R. Blais, c/o owner, engr.

About January 27

†**Colorado**—U. S. Eng., P. O. Box 1538, Albuquerque, N. M., John Martin Reservoir Project, reconstruction of electrical distr. sys., Caddoa, Serial No. Eng. 29-005-49-49.

January 27

†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, 45,000 cu. yd. semi-compacted and 34,500 cu. yd. uncompacted earthwork, 19,500 cu. yd. drainage ditch excav., etc., Red River Levees, Serial No. Eng. 16-047-49-206.

O., Circleville—Dpt. P. Wks., George B. Sowers, dir., Columbus, Pickaway County Memorial Lake in Hargus Creek, incl. 100 ft. concrete dam and spillway, moving approx. 328,000 cu. yd. earth to help produce the fill, $225,000, incl. land, etc. CD 8/21/47—ENR 9/4/47.

January 28

†**Arkansas**—U. S. Eng., foot of Prytania St., New Orleans, La., constr. approx. 280,000 cu. yd semi-compacted earthwork on Red River Levees, Miller Co.

†**Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, 260,000 cu. yd. semi-compacted earthwork etc., Red River Levees below Denison Dam, Serial No. Eng. 16-047-49-207.

†**Utah**—U. S. Eng., 751 South Figueroa St., Los Angeles 14, Calif., emergency bank protection, San Juan River, Bluff, Serial No. Eng.-04-353-49-41.

January 30

†**Idaho**—Bureau Reclamation, Dpt. Interior, Boise, pump. plant, pipeline, and lateral embankment Kingman Colony Check, Owyhee Proj., Spec. RI-35, (Region 1). Extended date. L. N. McClellan, ch. engr. CD 12/14—ENR 12/16.

February 1

Minn., Gaylord—Sibley Co., W. C. Oldenburg, aud., impry. County Ditch 13A and laterals, incl. 508,216 cu. yd. excav., 40 culverts, 10,400 lin. ft. drain pipe, various sizes, 5 outlet pipes, $101,323, E. L. Chamberlin, Olivia, Minn., engr.

†**Montana**—U. S. Eng., Fort Peck, right abutment downstream slope drainage sys., Fort Peck, Serial No. Eng. 24-016-49-51. CD 12/23—ENR 1/6.

†**Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, dredging Bay Center Channel, Willapa Harbor, Serial No. Eng-45-108-49-97.

February 2

†**Arizona and Nevada** — Bureau Reclamation, Dpt. Interior, Boulder City, Nev., River Control Bldg. addn. alterations, at Boulder

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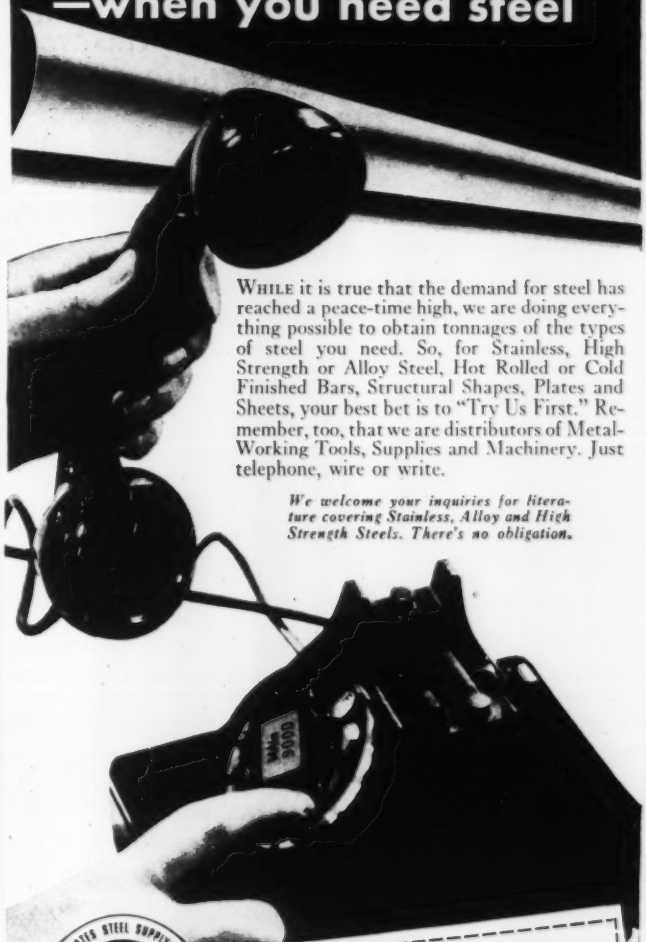

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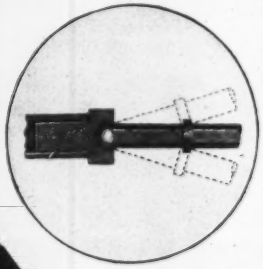

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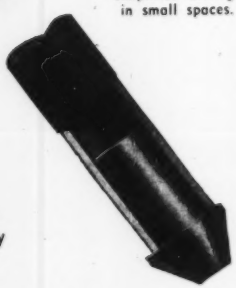

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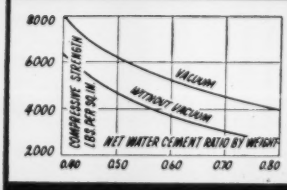

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February 8

●†**South Dakota**—U. S. Eng., 1709 Jackson St., Omaha, Neb., turbines, Fort Randall Dam. $2,000,000-$4,000,000.

March 8

●†**Texas**—U. S. Eng., 606 Santa Fe Bldg., Galveston, completing embankment spillway and service bridge for San Angelo Dam and Reservoir Proj. Approx. $2,500,000. CD 11/11—ENR 11/18, under LB.

LOW BIDDERS

New York—Bertram D. Tallamy, supt. Dpt. P. Wks., Albany, received no bids Jan. 12, flood control Projs. 1 to 11 (inclusive) Village of Aveca, Village of Painted Post and city of Corning, Steuben Co. CD 12/23—ENR 12/30.

●†**Washington**—Bureau Reclamation, Dpt. Interior, Coulee Dam, Jan. 7, river imprvs. and repairing spillway face and spillway bucket, Columbia Basin Proj., Spec. 2475 from Pacific Bridge Co., 333 Kearny St., San Francisco, Calif., $1,804,840. CD 12/9—ENR 12/16.

CONTRACTS AWARDED

Miss., Tupelo—Lee County Drainage Comn., c/o contractor, cleaning 15 acres, 318,000 cu. yd. channel excav., clearing, clean-out excav. 11 mi. channel, to William Crumpecker & Sons, Morehouse, Mo., $82,775. Bids 12/31.

●†**O., Massillon**—U. S. Eng., Madison Ave. and s St. W., Huntington, 18, W. Va., local protection proj. along Tuscarawas River, Inv. Eng. 46-022-49-60, to Wright Constr. Co., Williamston, Mich., $2,409,138. Bids 12/14. CD 12/29—ENR 1/6, under LB.

†**South Carolina**—U. S. Eng., 1st and Douglas Sts. N. W. Wash. 25, D. C., removal 1,516,100 cu. yd. material from Intracoastal Waterway between Charleston and Winyah Bay, Charleston and Georgetown Counties, to Norfolk Dredging Co., Compostella Wharf, Norfolk, Va., $189,513. Awarded 1/7.

AIRPORTS AND AIRBASES

BIDS ASKED

January 26

†**Va., Chincoteague**—AIRPORT BLDGS.—P. Wks. Office, Headquarters, Fifth Naval Dist. U. S. Naval Base, Norfolk, Zone 11, married officers quarters at Naval Auxiliary Air Station and Naval Aviation Ordnance Test Station, Spec. 18278. Noy 14208. Plans deposit $10.

February 1

†**N. D., Fargo**—TAXIWAY—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., concrete surfaced taxiway connection from Taxiway 2 to Aircraft Parking Apron at the Hector Airport, Serial No. 25-066-49-151. CD 12/20 — ENR 12/30.

LOW BIDDERS

†**Ala., Birmingham**—PARKING APRONS—U. S. Eng., P. O. Box 1169, Mobile, 7, Jan. 5, addnl. parking aprons at Municipal Airport, from Dunn Constr. Co., First National Bldg., Birmingham, $140,462. CD 12/22.

LATIN AMERICA

Argentina—Direccion General de Agua y Energia Electrica, Buenos Aires, receiving bids March 3, Rueleches Dam which is to be built over Rio Colorado River in Central Argentina, will develop 62,000 kw. from four groups of turbines, slab and buttress structure. $16,000,000. CD 10/7—ENR 10/14.

Chile, Chuquicamata—Chile Exploration Co., Co., Santiago, dwellings for workmen and employees, own forces. $300,000.

Mexico, Salamanca—Mexican Govt., Serita. de R. H. Balderas, 94, Mexico, D. F., receiving bids February 11, building 33 kilometers upper structures of Canal Alto (High Canal). Plans deposit $30. J. Vincente Orozco, Serita. de R. H. Balderas, 94, Mexico, D. F., ch. irrigation engr.

PUBLIC BUILDINGS

BIDS ASKED

January 26

Miss., Jackson—Hinds Co., Jackson, 16 classroom and auditorium addn. to Forest Hill High School. Plans deposit $25, Spain & Biggers, Deposit Guaranty Bank Bldg., archts. CD 3/3/44—ENR 3/23/44.

Pa., Phila.—Dpt. Property & Supplies, Harrisburg, service tunnel and steam and hot waterlines, Phila. State Hospital. Over $28,000. Jack S. Steele Co., 1416 Chestnut St., engr. CD 2/10/47—ENR 2/20/47.

Pa., Polk—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, general construction, heating and ventilating, plumbing and drainage, electrical work, 2 passenger elevators for hospital at Polk State School. $860,000. Plans deposit $15 general, $7.50 others. The Thayer Co., Lever Bldg., New Castle, engr. and archt. CD 2/19/48—ENR 3/4/48.

January 27

†**Colo., Denver**—Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, foundations for Universal Testing Machine and alterations to Bldg. 1-B, office of Chief Engineer, approx. 10 mi. west of Denver, at Denver Federal Center, near here. L. N. McClellan, ch. engr.

†**D. C., Wash.**—U. S. Eng., First and Douglas Sts. N. W., army theater, Army Medical Center,

Walter Reed General Hospital, Serial No. 49-080-49-73-(19) M.

Mo., Fulton—Dpt. P. Health & Welfare, Samuel Marsh, dir. State Office Bldg., Jefferson City, and J. F. Powell, dir. P. Bldgs., State Capitol, Jefferson City, brick, concrete employees' dormitory, State Hospital 1. $450,000. Sverdrup & Parcel, Inc., 915 Olive St., St. Louis, Zone 1, archt. CD 9/25/47—ENR 10/16/47.

Mo., Marshall—State Dpt. P. Health & Welfare, Sam Marsh, dir., State Office Bldg., Jefferson City, and J. F. Powell, dir. P. Bldgs., State Capitol, Jefferson City, 2 and 1 story, 55x66 ft. and 36x178 ft. and 30x55 ft. brick, concrete, tubercular patients' bldg.; 3 story, 42x169 ft. brick, concrete, stone hospital, Missouri State School. Bids 12/17 for tubercular patients' hospital rejected. Jamieson & Spearl, 1696 Arcade Bldg., 812 Olive St., St. Louis, Zone 1, archts. CD 12/31—ENR 1/6.

January 27

N. D., Grand Forks — Bd. Educ., Grand Forks, 3 schools, $265,000. S. T. DeReaomer, 610 Viets Ave. and T. B. Wells, Northern Hotel, archts. CD 12/13—ENR 1/6.

January 28

O., Cleveland Heights — Bd. Educ., 1749 Lee Rd., Cleveland Heights High School addn., Cedar and Lee Rds. Plans deposit $15. Garfield, Harris, Robinson & Schafer, 1740 E. 12 St., Cleveland, archts. CD 5/15/47 — ENR 5/29/47.

Tex., Woodville — Tyler Co., Lou Cruse, judge, 1 and 2 story masonry, concrete, steel 23-bed county hospital. $225,000-$250,000. Consolidated Architects & Engineers, 1010 Fort Worth Natl. Bank Bldg., Fort Worth, engrs. and archts.

January 31

O., Boardman — Boardman Local School Dist., M. C. Simon, clk., 859 E. Midlothian St., Youngstown, Boardman School, Market St. Plans deposit $25. Kling & Frost, 661 Wick Ave., Youngstown, archts. CD 8/27/46—ENR 9/5/46.

Tex., Seabrook — Clear Creek Independent School Dist., Seabrook, 14 room masonry, hollow tile, elementary and Junior High School, concrete fdn. $400,000; 10 classroom masonry, hollow tile school, concrete fdn. at Kemah and 4 room school addn. at League City $300,000. R. G. Schneider, 520 W. Bell Ave., Houston, archt. CD 10/13—ENR 10/28.

February or March

†N. C., Fort Bragg—U. S. Eng., 308 Customhouse, Wilmington, family quarters. Extended date. CD 12/30—ENR 1/6.

February 1

Calif., Sacramento—State Div. Architecture, P. Wks. Bldg., furnishing, erecting structural steel frame for 5 story, bsmnt. State Capitol Addn., Anson Boyd, Sacramento, state archt. CD 10/11/43—ENR 10/14/43.

†Colorado — Bureau Reclamation, Building 1-A, Denver Federal Center, Denver, furnishing, del. f.o.b. cars shipping point or f.o.b. cars Loveland and Granby, one 2¾ ton transformer transfer car for Marys Lake Power Plant; one 35 ton transformer transfer car for Estes Power Plant and one 37 ton transformer transfer car for Granby Pumping Plant. Colorado-Big Thompson Proj., Spec. 2520. L. N. McClellan, ch. engr.

February 2

●N. C., Greensboro—Woman's College of the University of North Carolina, J. C. Lockhart, asst. controller, Greensboro, dormitory, $1,000,000. Northrup & O'Brien, 602 Reynolds Bldg., Winston-Salem, archts. CD 11/21/45—ENR 12/6/45, under Commercial Buildings.

February 3

†N. M., Albuquerque—U. S. Eng., P. O. Box 1538, fifty officers' family quarters, utilities (Sandia Base EOP-923A), Serial No. Eng-29-005-49-52. CD 12/15—ENR 12/30.

February 8

●Wis., Madison—Bd. Regents, University of Wisconsin, Madison, 2 story, bsmnt., 96x150 ft., steel, brick dairy, concrete fdn., $2,500,000. Plans deposit $25. Grassold & Johnson, 734 N. Jefferson St., Milwaukee, Zone 2, archts. R. C. Kirchhoff, state archt. CD 5/6—ENR 5/27.

February 15

●N. Y., Schenectady — Municipal Housing Auth., 402 Millard St., Housing Proj. NYS-34, East Van Vranken Ave. $3,224,000. Karas & Van De Bogert, 126 Wall St., archts. CD 9/22—ENR 9/30, under LH.

February 16

●†Ia., Ames—U. S. Atomic Energy Comm., Lawton D. Geiger, area mgr., P. O. Box 16 A, Station A, 3 story, bsmnt., rein.-con., brick (general laboratory) Research Bldg., Iowa State College campus, $1,750,000. Extended date. Tinsley, Higgins & Lighter, 526 Liberty Bldg., Des Moines, archt. CD 11/17—ENR 11/25.

Bids Asked

†Ga., Camp Gordon (P.O. Augusta)—U. S. Eng., Post Office Bldg., Savannah, rehabilitation bldgs., facilities, Station Hospital, Serial No. Eng.-09-133-49-79. Extended date. CD 1/3—ENR 1/6.

●Mass., Boston—City, Wm. J. McDonald, lessee, 1 Court St., garage under Boston Common, entrance on Charles St., $5,000,000-$8,000,000. Whitman & Howard, 89 Broad St., and Mark Linenthal, 16 Lincoln St., engrs. CD 5/24—ENR 6/10.

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●**Pa., State College**—Penna. State College, State College, 3 men's dormitories, $4,000,000. Harbeson, Hough, Livingston & Larson, 117 S. 17 St., Phila., archts. Sauter & Castor, 1411 Walnut St., Phila., engrs. CD 9/28—ENR 10/14.

Va., Burkeville — Dr. Charles W. Scott, supt. State of Virginia, Richmond, Piedmont Sanatorium (Hospital and Nurses Home) addns. Over $500,000. Plans deposit $75. Joseph H. Saunders, Jr., 815 King St., Alexandria, archt. and engr.

LOW BIDDERS

●†**Calif., San Diego**—Veterans Admin., Munitions Bldg. Wash., 25, D. C., rejected bids Dec. 14, general contract 200-bed veterans administration hospital, L. B. **$4,030,000.** Project abandoned. CD 12/16—ENR 12/23, under LB.

Ky., Owensboro — Owensboro-Daviess Co. Hospital, Owensboro, Dec. 21, general contract 6 story hospital addn., from Whittenberg Constr. Co., 2214 S. Floyd St., Louisville, **$556,800.** CD 12/8.

●**Pa., Embreeville**—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, rejected bids Dec. 8, general contract kitchen and dining bldg., L. B. **$458,770;** acute admission, infirmary and administration bldg., L. B. **$831,043,** at Embreeville State Hospital. CD 12/13, under LB.

●**Pa., Harrisburg**—Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C., project abandoned, 3 or 4 story 200 bed brick, masonry hospital, 29 and Rudy Sts. **$3,745,000.** CD 1/10/47—ENR 1/23/47.

Pa., Phila.—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, Jan. 12, general contract renovating Bldgs. A and C at Phila. State (Byberry) Hospital, from L. F. Driscoll, 18 W. Chelten Ave., Zone 44. **$593,800.** CD 12/13—ENR 12/16.

Tex., Odessa—City, A. P. Brown, mayor, rejected bids Dec. 14, central police and fire station, L.B. **$283,916.** CD 12/21—ENR 12/30, under LB.

†**Wis., Milwaukee**—Ninth Naval Dist., Great Lakes, Ill., rejected bids Dec. 20, U. S. Marine Corps Reserve Training Center alterations, NOY 17354. CD 12/9.

CONTRACTS AWARDED

●**O., Columbus**—Dpt. P. Wks., George Sowers, dir., Columbus, general contract library addn. at Ohio State University, to Mellon-Stuart, 210 E. Park Way, Pittsburgh, Pa., **$2,423,299.** Bids 12/9. CD 1/4—ENR 1/13, under LB.

●**Pa., Embreeville**—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, general constr. acute admission, infirmary and administration bldg. and kitchen and dining bldg. at Embreeville State Hospital to McCloskey Houses, Inc., 1620 West Thompson St., Phila. Zone 21, $1,234,000. CD 12/13—ENR 12/16, under LB.

●**B. C., Vancouver**—Vancouver General Hospital, L. N. Hickernell, dir., hospital, 10 and Heather Sts., first unit nurses residence, to Marwell Constr. Co. Ltd., 410 Seymour St. Approx. **$1,086,326.** CD 1/6—ENR 1/13, under LB.

COMMERCIAL BUILDINGS

BIDS ASKED

About January 29

●**Pa., Pittsburgh**—U. S. Steel Corp., Koppers Bldg., and Mellon Bank and Trust Co., 514 Smithfield St., 40 story bsmnt., brick, stone, steel office, $20,000,000. Wm. Y. Cocken, Century Bldg., archt. Harbison & Abramovitz, 45 Rockefeller Plaza, New York, N. Y., assoc. archts. CD 12/31—ENR 1/13.

January 31

Mass., Worcester — St. Spyridon's Greek Orthodox Church, C. M. Moschos, chn. Bldg. Fund Comm., Curondo Hotel, 1 story, bsmnt., 72x156 ft. church parish house, 4 story steeple, Russell and Elm Sts., $300,000. Eugene Eugenides, 1329 W. 74 St., Chicago, Ill., archt.

About February 2

Pa., Pittsburgh—St. Basils Roman Catholic Congregation, Brownsville Rd., 3 story, brick, tile, steel limestone high school addn., alterations, Concordia and Meredith Sts. $400,000. Kaiser, Neal & Reed, Keystone Bldg., archts. CD 10/2/47—ENR 10/9/47.

About March 1

N. J., Trenton—William McKinley Memorial Hospital, Brunswick and Ferrier Aves., hospital wing addn. $300,000. Louis S. Kaplan, 25 N. Montgomery St., Zone 8, archt. CD 11/7/47—ENR 11/20/47.

About April 1

●**Ala., Birmingham**—St. Vincent's Hospital, c/o Charles H. McCauley, Jackson Bldg., hospital annex, $1,000,000. CD 4/19—ENR 4/29.

Bids Asked

Ill., Chicago—Lane Bryant, Inc., 101 N. Wabash St., remodeling store, $300,000. Loewenberg & Loewenberg, 111 W. Monroe St., archts.

Pa., Phoenixville—W. T. Grant Co., Montgomery Trust Arcade, Norristown, department store and office, $250,000. A. Cunnius, 1441 Broadway, New York, N. Y., owners archt. CD 5/20—ENR 6/3.

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Ga., Columbus — Southern Bell Telephone Co., Hunt Bldg., Atlanta, soon lets contract

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LOW BIDDERS

Calif., San Francisco—California Academy of Sciences, Golden Gate Park, Jan. 6, 1 story, steel rein.-con. planetarium, from Cahill Brothers, 296 Sansome St., San Francisco. Est. over **$250,000.** CD 1/4—ENR 1/13.

Fla., St. Petersburg—American Legion Hospital for Crippled Children, c/o Hadley & Atkinson archts., 211 Taylor Arcade, St. Petersburg, Jan. 7, hospital, from Mills & Jones, Inc., 2260 4 Ave. S., **$645,000.** CD 12/16 ENR 12/30.

Tex., Dallas — Reserve Life Insurance Co., Thomas Bldg., will not construct office. Project abandoned. CD 11/3—ENR 11/11, under LB.

●**Wash., Seattle** — Suburban Co., c/o John Graham, Jr., archt., Dexter Horton Bldg., Zone 4, land imprvs. and concrete structural work on all bldgs. in Northgate shopping center, from Howard S. Wright & Co., 407 Yale Ave. N. **$2,500,000.** CD 2/2/48—ENR 3/11/48.

CONTRACTS AWARDED

Ala., Montgomery—All States Life Insurance Co., Clyde Jennings, pres., 116 Catoma St., 125 homes. Owner builds. Over **$500,000.**

●**Calif., Los Angeles**—Liberty Bldg. Co., 5548 Arbar Vitae St., 111 frame, stucco, dwellings. Owner builds. **$1,000,000.** Harry McDonald, Los Angeles, archt.

●**Calif., Los Angeles**—Arthur B. Webber & E. S. Diller, 6307 Wilshire Blvd., 37 six-room frame, stucco dwellings, **$370,000;** South West Drafting Service, 2724 W. Florence Ave., archts.; apartment housing, 20 bldg. units of various sizes, **$1,828,628,** Martin Stern Jr., 8939½ Santa Monica Blvd., Beverly Hills, archt. Owner builds.

Conn., Stratford — McNeil & Blamey, Inc., Highland Ave., 40 homes, Main and E. Main St. Owner builds. **$600,000.**

Fla., Miami—Coral Gate Properties, c/o contractor, 108 homes, to D. M. W. Contg. Co., Inc., 1869 S.W. 37 Ave., Est. over **$600,000.**

Ga., Atlanta—Oakland City Apartments, Inc., c/o John W. Cherry, archt., Candler Bldg., 88 apartment units to Algernon Blair, Henry Grady Bldg. Est. over **$300,000.**

●**Ga., Decatur**—Long Construction Co., c/o L. D. Long, pres., P. O. Box 355, Charleston, S. C., 3,000 homes (40 different floor plans), own forces. Over **$10,000,000.**

Ill., Chicago—American Radiator & Standard Sanitary Corp., 5210 W. Roosevelt Rd., 1 story, brick, concrete, steel bldg., to J. Emil Anderson & Son, 1809 Balmoral St. Est. **$160,000.** Arthur M. Heda, 2844 W. Cataipa St., archt.

Mass., Holyoke — Young Mens Christian Assn., Holyoke, Y.M.C.A. bldg. addns., alterations, to D. O'Connells Sons Co., Inc., 489 Hampden. **$427,472.** Bids 9/29. CD 10/12—ENR 10/14, under LB.

Mass., Marblehead—W. J. DuWors & Co., 7 Water St., Boston, fifty 1 story, bsmnt. residences. Owner builds. **$375,000.**

Mass., Quincy, Braintree, Weymouth, etc.—W. J. DuWors & Co., 7 Water St., Boston, one hundred 1 story, bsmnt. residences. Owner builds. **$750,000.**

●**Minn., Duluth** — St. Lukes Hospital, J. McVey, supt., 916 E. First St., general contract 6 story, bsmnt. hospital addn., to J. D. Harrold Co., 405 E. Superior St. Total est. **$1,500,000.** CD 12/9/47—ENR 1/1/48.

● **N. Y., Jackson Heights**—Barnet Shefkowitz & Assoc., c/o Kavy & Kavovitt, & archts., 44 Court St., Brooklyn, Zone 2, two 6 story apartments, 34 Ave. between 78 and 79 Sts. 34 Ave. between 77 and 78 Sts. Owner builds. **$2,000,000.**

N. Y., New York—K. & R. Holding Corp., Charles Kirschenbaum, pres., 389 Fifth Ave., Zone 16, eight 1-family houses, Astor and Woodhull Aves. Owner builds. **$250,000.**

●**N. Y., Rego Park**—Tishman Realty & Constr. Co., 415 Park Ave., New York, Zone 22, garden apartment proj., 10 six story bldgs. for 1,000 families on ten acre site bounded by Woodhaven Blvd., Dry Harbor Rd. 84 St. and 62 Dr. Owner builds. **$10,000,000.** Kelly & Gruzen, 220 Broadway, New York, Zone 7, archts.

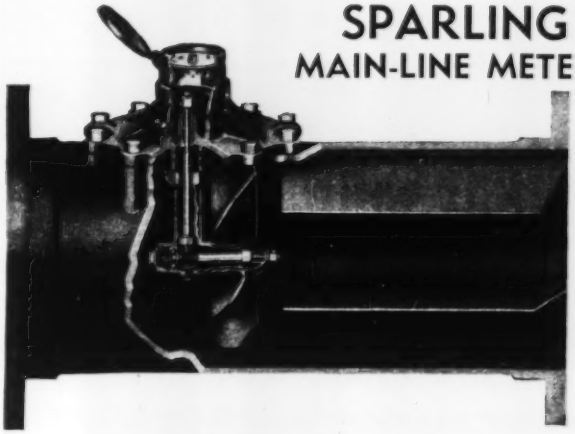
●**Okla., Tulsa**—First National Bank & Trust Co., 325 S. Main St., 20 story office, air conditioned, on 100x140 ft. site, to Manhattan Constr. Co., Muskogee, under supervision of John W. Harris Assoc., 30 Rockefeller Plaza, New York 20, N. Y. Approx. **$5,500,000.** Carson & Lundin, 50 Rockefeller Plaza, New York, N. Y., archts.

Pa., Drexel Hill — The Aronimink Gardens Corp., 217 S. 69 St., Upper Darby, store development, Ferne Blvd., separate contracts. **$250,000.** James G. Ludwig, 6403 Market St., Upper Darby, archt.

Pa., Phila.—Beechwood Gardens, Inc., c/o Richard R. Neely & Charles H. Fulker Associates, 10 S. 18 St., apartment, Woodlawn and Beechwood Aves., separate contracts. **$300,000.**

Pa., Phila.—Robinson Bldg., 15 and Chestnut Sts., bldg. alterations, to S. Yellin & Son, Inc., 222 N. 11 St., over **$250,000.** CD 11/23—ENR 12/2.

Pa., Phila.—Torresdale Corp., 5501 Torresdale Ave., residential development, Chelten-



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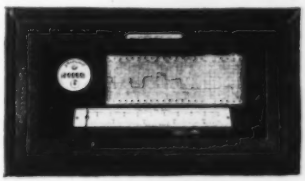

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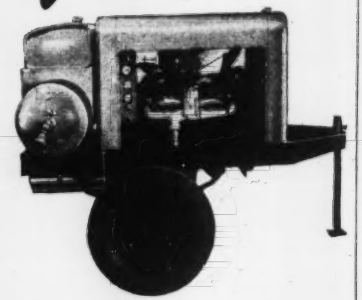

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ham Ave., separate contracts. **$259,200.** David Jenkins, 5116 Oakland Ave., archt.

Pa., West Norriton Twp. (Norristown P. O.)—John W. Cullen, 34 S. 18 St., Phila., residential development, Sterigere St., separate contracts. **$250,000.**

●**Que., Pointe aux Trembles (Postal District Montreal)**—Reverend Sisters of the Divine Heart, Notre Dame St., Montreal East, infants home, E. Sherbrooke St., to J. Filion, 7989 Drolet St., Montreal. **$1,000,000.** Gascon & Parent, 934 E. St. Catherines St., Montreal, archts. CD 7/3/46—ENR 7/18/46.

INDUSTRIAL BUILDINGS

BIDS ASKED

January 24

Ont., Brantford—WAREHOUSE—M. W. Dillon & Co., archts., Bank of Toronto Chambers, London, 55x85 ft., rein.-con. brick, steel warehouse, for Hobbs Glass, Ltd., 54 Duke St., Toronto. Approx. $75,000.

About March 1

●**Tex., Dallas** — DISTRIBUTION CENTER, etc.—Eastman Kodak, 343 State St., Rochester, New York, 120,000 sq. ft. masonry distr. center and processing station, Cedar Springs Rd. and Manor Way. **$1,000,000.** Thomas, Jameson & Merrill, 820 N. Harwood St., archts. CD 11/4—ENR 11/18.

Bids Asked

Pa., Marcus Hook—INDUSTRIAL—General Chemical Co., 1100 Lane St., Camden, N. J., 7 industrial bldgs. alterations. Approx. $68,000. E. M. Richardson, c/o owner, engr.

Que., Montreal—FACTORY—Taran Furs Incorp., 4133 St. Dominique St., factory addn. $70,000. Mayerovitch & Bernstein, 1178 Philips Peace, archt.

SOON LETS CONTRACT

Pa., Chester—SALES and SERVICE, etc.—C. R. Loughead, Inc., 9 and Sprout Sts., soon lets contract auto sales and service, and garage. Approx. $68,000. Norman Hulme, 1524 Chestnut St., Phila., archt. CD 7/23—ENR 7/29.

Pa., Pittsburgh—PLANT—Demase & Manna Co., 2918 Smallman St., soon lets contract 1 and 2 story, 75x100 ft., concrete block with brick face food packing plant, steel beam, Pike and 15 Sts. $80,000. Wm. C. Young, 903 Standard Life Bldg., archt.

Tenn., Kingsport — WAREHOUSE — Kingsport Press, c/o Charles T. Main, archt., 80 Federal St., Boston, Mass., soon lets contract warehouse. Approx. $75,000. CD 7/30/46/—ENR 8/22/46.

●**Tenn., Nashville** — PRINTING PLANT — Methodist Publishing House, 810 Broad St., soon lets contract printing plant addns. $1,500,000. Hart, Freeland & Roberts, 3rd Natl. Bank Bldg., archts. CD 11/8—ENR 11/11.

CONTRACTS AWARDED

Fla., Winter Haven—PLANT—B. C. Skinner Mchy. Co., Dunedin, frozen citrus concentrates unit plant, c/o Adams Packing Assn., Winter Haven. Est. over **$700,000.**

Ill., Chicago—LUMBER STORAGE SHED—Ed. Hines Lumber Co., 2413 S. Wolcott St., 1 story, 200x504 ft. lumber storage shed, to Carl E. Erickson Co., 4657 N. Ravenswood St. Battey & Childs, 231 S. La Salle St., archts.

Ill., Cicero—PLANT—Pheoll Mfg. Co., 5709 W. Roosevelt Rd., 1 story, brick, concrete plant, Ogden Ave. and 21 St., to Campbell Lowrie Lautermilch, 409 W. Madison St. Est. **$700,000.** Olsen & Urbain, 5 S. Wabash St., archts.

●**Ind., East Chicago** — MILL — Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O., 1 story, concrete, brick, steel mill, to Aetna Standard Eng. Co., Home Savings & Loan Bldg., Youngstown, O. Est. **$5,000,000.**

Ky., Junction City—PLANT—Kraemer Veneer Plant, c/o Ross Kraemer, Junction City, plant to replace Burnside Veneer Plant, Burnside, separate contracts. Est. **$500,000.** L. V. Abbott, 2323 S. Brook St., Louisville, archt. **(Correction**—estimated cost). CD 1/10—ENR 1/13.

N. J., Jersey City—SALES and SERVICE—Jersey Motors, Inc., 401 N. Broad St., Elizabeth, auto sales, service and showroom on State Hy. 1 and Collard St., to E. M. Johnson Co., 706 Bergen Ave. Est. **$200,000.** Maurice Kraut, 22 Journal Square, archt.

N. J., South Kearny—WAREHOUSE—American Stores Co., 424 N. 19 St., Phila., Pa., warehouse alterations, to Underpinning & Foundations Co., Inc., 155 E. 44 St., New York, N. Y., over **$68,000.** Bids 11/10—ENR 11/18.

Pa., Pittsburgh—WAREHOUSE—Safety First Supply Co., Fernando St., 1 story, 60x120 ft., brick, concrete block warehouse, Vickroy and Magie Sts., to D. W. Smith, Inc., 11 Banksville Rd. Est. **$85,000.** Charles Roberts, 121 S. Negley St., archt.

Tenn., Memphis — WAREHOUSE — Remis Bag Co., c/o contractor, warehouse, to P. W. Jameson, 2257 Summer Ave. Est. approx. **$75,000.** Bids 12/15. CD 12/16—ENR 12/23.

Va., Lynchburg—PLANT—National Battery Co., c/o contractor, battery mfg. plant, to C. L. Lewis, Inc., Lynchburg. Est. **$250,000.**

Wash., Seattle—FACTORY—**Associated Lead & Zinc Co.**, 2736 16 Ave., S. W., lead and zinc factory addn., day labor. **$100,000.**

Wis., Shawano—FACTORY—Shawano Furniture Co., Shawano, 1 story, 70x149 ft., steel, concrete block factory, concrete fdn., day labor. Oppenhamer & Obel, Wausau, archts.

Wis., Superior — GARAGE — Jensen Motors Agency, Superior, 1 story, 70x140 ft., steel, brick, concrete garage, concrete fdn., to Roland C. Buck, Inc., 1225 Tower Ave. Hansen & Dobberman, 1225 Tower Ave., archts.

Wis., Wausau—FACTORY—Underwood Veneer Co., 231 Thomas St., 2 story, 70x114 ft. factory addn., concrete fdn., day labor. Oppenhamer & Obel, Wausau, archts.

Wis., West Allis—GARAGE—John Quaden, 6819 W. Lincoln Ave., Zone 14, 1 story, 56x120 ft., steel, brick, concrete block garage, block fdn., to A. Guenther & Sons Co., 1828 S. 76 St., Zone 14. Est. **$100,000.** M. Vierheilig, 618 W. Lincoln Ave., Milwaukee, Zone 4, archt.

UNCLASSIFIED

BIDS ASKED

January 26

†**Delaware and Maryland**—NIGHT LIGHTING SYS.—U. S. Eng., 121 N. Broad St., Phila. 1, Pa., addns. to complete night lighting sys., North Bank, Chesapeake and Delaware Canal, Inv. Eng. 36-109-49-79. Extended date. CD 12/20—ENR 12/30.

Pa., Philadelphia.—SERVICE TUNNEL—Dpt. Property & Supplies, 18 and Herr Sts., Harrisburg, service tunnel in connection with underground utility lines and service tunnel at Phila. (Byberry) State Hospital, separate contracts for underground cold waterlines; storm and sanitary sewers; electrical work. $420,000. Plans deposit $5 each. Jack S. Steele, 1417 Sansom St., Phila., Zone 2, engr. and archt.

Ont., Oshawa — TRANSMITTER STATION—Canadian Commercial Corp., 70 Lyon St., Ottawa, transmitter station for Dominion Govt., Dpt. National Defense, Cartier Sq., Ottawa. $100,000. Plans deposit $25.

P. E. I., Little Sands—WHARF—J. M. Somerville, secy., Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf reconstruction. Approx. $70,000. Bids 12/8 rejected. R. Blais, c/o owner, engr., CD 11/26—ENR 12/9.

January 27

†**Ark., Fort Smith** — CEMETERY BLDG. — U. S. Eng., Government Aircraft Plant No. 3, 2000 North Memorial Dr., Tulsa, Okla., utility bldg. and pertinent facilities, Fort Smith National Cemetery, Inv. No. Eng-34-066-49-63.

La., Eunice—STADIUM—St. Landry Parish School Bd., Opelousas, football stadium at Eunice High School.

New Jersey — LIGHTING — Spencer Miller Jr., comr., State Hy. Dpt., Trenton, modern lighting for Route 25, Port Street-Pulaski Skyway, requiring 253 highway units 260 luminaires for Route 25, the under-decks of 9 street overpasses and pedestrian walk-way for access from South St. to Newark Airport, Essex Co.

Texas—RURAL DISTRIBUTION LINES—Robertson Electric Co-operative, Inc., rural distr. lines, Robertson Co. Approx. $50,000. Plans deposit $25. J. H. Flood & Co., 707 Amicable Bldg., Waco, engrs. CD 12/27—ENR 1/13.

January 28

Tex., Dallas — PARK — City, c/o Park Bd., Ben Garza Municipal Park Improvt. Proj. $76,000. Richard Colley, Dallas, archt. CD 12/13/45—ENR 12/27/45.

February 1

●**Calif., San Francisco** — SPORTS ARENA — Winterland Corp., Post and Steiner Sts., 240x480 ft., 10,300 seating capacity steel, rein.-con. sports arena, Golden Gate Gardens, $2,000,000. W. D. Peugh, 333 Montgomery St., archt. CD 8/24—ENR 8/26, under LB.

†**Montana**—SERVICE TUNNELS, etc.—U. S. Eng., Fort Peck, service tunnel, electric, air and water lines in control shaft area, Fort Peck, Serial No. Eng. 24-016-49-50. CD 12/23—ENR 12/30.

†**Washington** — CIRCUIT BREAKERS—Bureau Reclamation, Dpt. Interior, Bldg 1-A, Denver Federal Center, Denver, Colo., power circuit breakers and lightning arresters for Grand Coulee 230 kv. right switchyard, Columbia Basin Proj., Spec. 2493. Extended date. CD 12/14—ENR 12/30.

February 2

La., Baton Rouge — STADIUM — East Baton Rouge Parish, Recreation & Park Comm., 115 St. Louis St., stadium. Plans deposit $30. CD 6/21—ENR 7/8.

Tennessee—RURAL DISTRIBUTION LINES—Cumberland Electric Membership Corp., Clarksville, 337 mi. rural distr. lines, Stewart, Montgomery, Robertson, Sumner and Cheatham Counties. Plans deposit $25. Wm. M. Wilson, East Side Public Square, Shelbyville, engr. CD 8/12—ENR 8/19.

N. B., Shippigan — WHARF — secy., c/o Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., wharf facilities at Savoy Landing. Approx. $205,000. Plans deposit $50. R. Blais, c/o owner, engr. CD 7/1—ENR 8/5.

February 3

N. Y., St. George—ELECTRICAL FACILITIES—Comr. Marine & Aviation, Pier A, North River, foot of Battery Pl., New York, Zone 7, electrical facilities for terminal, reconstructing

terminal, approaches at St. George Ferry Terminal, Contr. 2597-R. Plans deposit $25. CD 5/21/45—ENR 5/31/45.

LOW BIDDERS

Calif., Orland—EXHIBIT BLDG.—State Div. Architecture, P. Wks. Bldg., Sacramento, Jan. 4, stucco, wood, steel rigid frame exhibit bldg., from Modern Building Co., 116 W. 12 St., Chico, **$84,216.** CD 12/21—ENR 12/30.

†Colo., Grand Junction—SILO, etc.—U. S. Eng., P. O. Box 179, 200 Railway Exchange Bldg., Denver, Colo., Jan. 4, tile silo for coal storage, erecting bucket elevator with pit hopper, reciprocating feeder and installing utilities, from James B. Kenney, 3233 Osage St., Denver, Colo., **$52,777.** Est. Approx. $50,000.

Ia., Cedar Rapids—STADIUM—Independent School Dist., E. W. Lundquist, secy., Bd. Educ., Administration Bldg., 346 2 Ave., S. W., rejected bids Dec. 6, steel, concrete, brick athletic stadium, L. B. **$577,000.** CD 12/30—ENR 1/6, under Public Bldgs., LB.

Mass., Everett — STADIUM IMPRVS. — City, Stadium & Athletic Field Comm., 38 Cabot St., Jan. 5, electric lights, No. 637D, from D. A. Robbins Electric Co., 229A Boylston St., Brookline, **$64,485;** Memorial Stadium entrance, No. 637C, from Bond Bros., 77 Ferry St., **$123,018.** Maurice E. Witmer, Hillside Dr., Portsmouth, N. H., archt. CD 1/31/45—ENR 3/8/45.

Mass., Waltham — COAL STORAGE — Commonwealth of Mass., Dpt. Mental Health, 100 Nashua St., Boston, rejected bids, M-19, Contr. 1, coal storage and handling equip., Metropolitan State Hospital, L. B. $64,900; CD 11/24—ENR 12/2, under LB.

Pa., Phila. — ZOOLOGICAL GARDENS — Fairmount Park Comm., 34 St. and Girard Ave., rejected bids Dec. 15, zoological gardens, Carnivora House, L.B. **$849,000.** Est. $1,062,-562. CD 12/29—ENR 1/6, under LB.

†South Dakota — TELEPHONE LINE — Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., cancelled bids to have been opened Dec. 13, 38 mi. telephone line for Bixby Govt. Camp, Missouri River Basin Proj., Moreau River Unit, Spec. R6-21 (Region 6). CD 1/4.

†Washington — TRANSMISSION LINE — Bonneville Power Admin., 729 N. E. Oregon St., Portland, Ore., Jan. 4, 32.04 mi. Index-Snohomish section Foster-Creek-Snohomish 230 kv transmission line, Inv. 4429, Snohomish Co., from Smith Bros., Vancouver, **$578,165.**

†Philippine Islands—CEMETERY IMPRVS—U. S. Eng. (A.P.O. c/o PM, San Francisco Calif.), grading roads, constructing drainage structures for cemetery at Fort William, McKinley Military Res. Rizal Province, Inv. Eng-94-701-49-6, from Santiago Gancayco, Manila, **218,163** Pesos. Est. 210,134 Pesos.

CONTRACTS AWARDED

●Alabama, Missouri and Oklahoma—RAILS—St. Louis-San Francisco Railway Co., H. B. Barry, ch. engr., Springfield, Mo., laying 25 mi. new 132 pound rail and 52 mi. new 115 pound rail, replacing 500,000 track ties, timber bridge renewal, etc. at various points along system under 1949 maintenance and renewal program, own forces, **$2,500,000.**

Kan., Lawrence — DRIVE-IN THEATRE — Commonwealth Amusement Corp., 215 W. 18 St., Kansas City, Mo., drive-in theatre, incl. screen, projection tower, concession stands, drainage, water and lighting facilities, speakers, walks and drives, Rt. 59, separate contracts, **$100,000.**

La., Morgan City — NATURAL GAS SYSTEM — City, City Hall, natural gas sys., to W. D. Owens Constr. Co., 232 First National Bank Bldg., Montgomery, Ala., **$351,707.** Bids 1/6. CD 12/23.

Mass., Waltham — COAL STORAGE — Commonwealth of Mass., Dpt. Mental Health, 100 Nashua St., Boston, Contr. 2, installing stoker for power plant imprvs., Metropolitan State Hospital, to J. J. Hurley & Co., 17 Power St., Dorchester, **$131,270.** CD 11/24—ENR 12/2, under LB.

Mo., Jefferson City—DRIVE-IN THEATRE—Beverly Miller & Assoc., Rt. 50, Jefferson City, drive-in theatre, incl. screen structure, projection tower, concession stands, drives, walks, lighting, drainage and water facilities, snack bar and playgrounds, Rt. 50, separate contracts. Over **$100,000.**

Mo., Sedalia—DRIVE-IN THEATRE—Commonwealth Amusement Corp., 215 W. 18 St., Kansas City, Mo., drive-in theatre, incl. screen, projection tower, concession stands, drainage, water and lighting facilities, walks, drives, etc., separate contracts. **$150,000.** CD 12/3—ENR 12/30.

Pa., Phila. — PARK — Phila. American League Baseball Club, 21 St. and Lehigh Ave. Shibe Park addns., alterations to Erny & Nolen, 6316 Germantown Ave. **$90,000.** CD 7/30—ENR 8/19.

Texas — GAS CONNECTING LINES — Lone Star Gas Co., 1915 Wood St., Dallas, natural gas connecting lines, force account, **$65,000.** CD 10/5—ENR 10/7.

Tex., Fort Worth — RADIO STATION — Southwestern Baptist Theological Seminary, Seminary Hill, FM radio station, Purchase and Hire, **$75,000.**

●Wisconsin — DAM — Dairyland Power Cooperative, 407 Rivoli Bldg., LaCrosse, dam and power plant, 5 mi. northeast of Ladysmith, REA Proj., Wis. 64 La Crosse, to Fegles Constr. Co., 711 Wesley Temple Bldg., Minneapolis, Minn., **$4,503,477.** Bids 11/8. CD 11/22—ENR 12/2, under LB.

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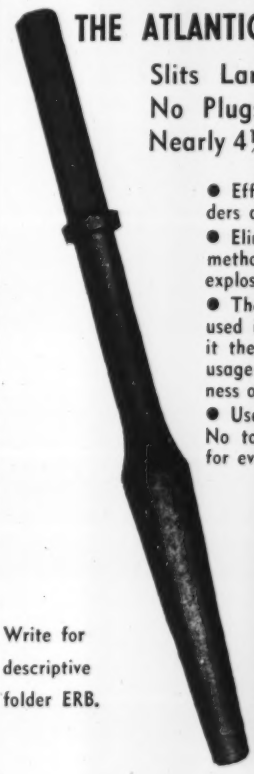

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CONSTRUCTION REPORTS—Third Section

WATER SUPPLY

BIDS ASKED

January 26

N. Y., New York—Comr. Water Supply, Gas & Electricity, Municipal Bldg., Zone 7, water-mains, appurtenances, Audubon, Lexington and Pinehurst Aves., E. 33, E. 51, W. 49, W. 58, W. 68, W. 147 and W. 150 Sts. Plans deposit $1.

January 28

Tex., Corpus Christi—City, H. H. Allen, mgr., 1 m.g. elevated steel water storage tank, south side of town, $150,000; 1 m.g. elevated steel water storage tank, southwest side of city, $150,000. Robert L. Otto, city engr. CD 1/10/46—ENR 1/24/46.

January 31

Tex., Waco—City, c/o Water Supt., concrete fdns. for 750,000 gal. elevated tank. $30,000. Plans deposit $10. Joe J. Rady, 811 American Fidelity Bldg., Fort Worth, engr. CD 7/23—ENR 8/5.

Ont., Galt—North Dumfries Twp., c/o H. G. Elliot, clk., R. R. 7, Galt, watermains, hydrants, $50,000. Proctor, Redfern & Laughlin, 61 Jordon St., Toronto, engr. CD 12/20/45—ENR 1/10/46.

February 4

La., Morgan City—City, City Hall, watermain extens., 200,000 gal. steel water tower, appurtenances, apparatus, equip. Plans deposit $20. T. Baker Smith, Houma, engr. CD 8/27—ENR 9/16.

February 8

La., Sulphur—Town, Town Hall, water treatment plant.

On or About February 16

†Mont., Fort Peck—U. S. Eng., Fort Peck, 210 ft. 6- to 12-in. flanged pipe, 10-in. R. & S. I. water pipe, manhole, floor drain, 500 G.P.M. pump, raw water line from power house to filtration plant, Serial No. Eng. 24-016-49-56.

LOW BIDDERS

Mich., Tillington—City, City Hall, WW. sys., from S. R. Livingstone & Co., Penobscot Bldg., Detroit, **$67,000.** Francis Eng. Co., Eddy Bldg., Saginaw, engrs.

Tex., Dallas—City, Earl Goforth, secy., c. i. watermains in McMillan St., from Cole Williams, Inc., Rte. 7, Box 429-A, **$43,192.** CD 12/1—ENR 12/23.

CONTRACTS AWARDED

Tex., Corpus Christi—City, H. H. Allen, mgr., addnl. c.i. waterlines, force account, **$66,495.** Robert L. Otto, city engr. CD 1/10/46—ENR 1/24/46.

Tex., Jacksonville—City, W. H. Oswalt, mgr., 800 ft. water supply well, to Layne-Texas Co., Ltd., 5402 Lawndale St., Houston. Approx. **$30,000.** CD 11/18—ENR 12/9.

SEWERS, WASTE DISPOSAL

BIDS ASKED

January 26

N. Y., Kew Gardens—President Queens Boro, 120-55 Queens Blvd., Kew Gardens Zone 15, sanitary sewers, 114 Dist. Nos. 120, 121 and 122 Sts.; 115, 149 and N. Conduit Aves., Lefferts Blvd., 114 and 122 Pls., combined sewer and appurtenances, 131 Ave. CD 7/16—ENR 8/5.

N. Y., New York—President Bronx Boro, 851 Grand Concourse, Zone 51, sewer, appurtenances, Fairmount Pl. and Van Nest Ave.; receiving basin, appurtenances, Shakespeare Ave. (west side), etc. CD 12/29—ENR 12/23.

January 27

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan St., furnishing, installing piping, appurtenances, Robicam Steam Generators 5, 6, and 7, Div. U, West-Southwest Sewage Treatment Works, Stickney. Extended date. Plans deposit $25.

January 28

Tex., Corpus Christi—City, H. H. Allen, mgr., storm sewers, Louisiana Ave. from Bay to Alameda St. $50,000. Robert L. Otto, city engr.

February 3

Tex., Taylor—City, interceptor sewers various sects. of city. $50,000. Plans deposit $20. The Marvin Turner Engineers, Nalle Bldg., Austin, engrs. CD 8/12—ENR 9/2.

February 7

La., Alexandria—City, City Hall, sewerage sys., sewer lift station, Enterprise Addn. CD 7/26/45—ENR 8/9/45.

Tex. and Ark., Texarkana—City of Texarkana, Tex., sewage disposal plant and outfall line. $450,000. Wyatt C. Hedrick, 304 Fort Worth Ave., Dallas, Tex., engr. CD 1/5—ENR 1/13, under LB.

LOW BIDDERS

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan St., Dec. 16, concrete diffuser plate holders and piping, West-Southwest Sewage Treatment Works, Div. LL, Stickney, from James H. McCauley & Sons, Inc., 5620 W. 65 St., **$529,683.** CD 12/10.

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan St., Jan. 13, electrical work, settling tanks, Battery C, Div. HH, West-Southwest Sewage Treatment Works, Stickney, from Northern States Co., 33 N. LaSalle St., **$724,379.** CD 3/9/45—ENR 3/19/45.

Mont., Billings—City, City Hall, Jan. 11, sewage treatment plant, incl. 15,080 cu. yd. excav., 2,650 cu. yd. concrete, 2 steel sludge collectors, screen house, grit chamber, 2 settling basins, sludge digestion tank, sludge control bldg., sludge drying beds, Parshall flume, from Riedesel Constr. Co., 2325 9 Ave. N., Billings, **$356,937.** CD 12/14—ENR 12/16.

CONTRACTS AWARDED

Tex., Corpus Christi—City, H. H. Allen, mgr., sanitary sewers portion of Water St., force account, **$55,000.** R. L. Otto, city engr. CD 10/15/47—ENR 10/30/47.

BRIDGES

BIDS ASKED

STATE HIGHWAY LETTINGS

January 25	**February 2**
North Carolina	**New York**
West Virginia	**February 10**
January 27	**California**
Michigan	**February 18**
February 1	**Saskatchewan**
New Jersey	

February 2

†Md., Chesapeake City—U. S. Eng., 1400 Penn Mutual Bldg., S and Walnut Sts., Phila. 1, Pa., approaches for highway bridge over Chesapeake and Delaware Canal, Serial No. Eng. 36-109-49-83. $100,000-$200,000.

LOW BIDDERS

California—State Div. Hys., 808 State Bldg., Los Angeles, Jan. 8, rein.-con. girder bridge and rein.-con. box section pedestrian undercrossing at Glendale Blvd. on Hollywood Parkway, from J. E. Haddock, Ltd., 2578 E. Foothill Blvd., Pasadena, **$469,457.** CD 2 15—ENR 12/23.

Idaho—State Hy. Dpt., Boise, Jan. 8, 227 ft. concrete, steel bridge and underpass north of Cascade, Valley Co., from Hansen & Pass Constr. Co., N. 1103 Calispi St., Spokane, Wash. **$168,814.**

New Jersey—State Hy. Dpt., Trenton, Jan. 13, bridges, approaches at Route 35, and King George's Post Rd. Route 4, Parkway, Sect. 1 A, FAB U-188 (7), Middlesex Co., from Villa Conts. Co., 233 North Ave. W., Westfield. **$781,664.** CD 12/30—ENR 1/6.

●Tex., Corpus Christi—Nueces Co., George Prowse, judge, cancelled bids to have been opened about Jan. 28, causeway from Flour Bluff area across the northern end of Padre Island, $1,750,000. Will re-advertise. CD 12/23—ENR 12/30.

†Virginia—Pub. Roads Admin., 1440 Columbia Pike, Arlington, Jan. 12, 2 bridges in Blue Ridge Parkway, Proj. 11-3, 11-4, Botetourt Co., from Abbott & Ritchie, 320 W. Cary St., Richmond. **$116,211.** CD 12 9—ENR 12/16.

CONTRACTS AWARDED

Mo., Cassville—Barry Co., Cassville, 3 bridges, to T. J. Anderson Constr. Co., 103 E. Jasper St., Tulsa, Okla. **$79,371.**

STREETS AND ROADS

BIDS ASKED

STATE HIGHWAY LETTINGS

January 25	**February 1**
North Carolina	**New Jersey**
West Virginia	**February 2**
January 26	**New York**
Louisiana	**February 9**
January 27	**California**
Michigan	

February 8

La., Bunkie—Town, soil cmt.-asph. 46,000 sq. yd. certain streets. Plans deposit $10. Pan American Engineers, 1418 Third St., Alexandria, engrs. CD 10/30/45—ENR 11/29/45.

LOW BIDDERS

California—State Div. Hys., 808 State Bldg., Los Angeles, c. conc. Firestone Blvd., (VII-LA-174 SGT) South Gate, Los Angeles Co., from O'Brien & Bell Constr. Co., Santa Ana, **$147,167***** imported borrow material Arroyo Seco Parkway between Bartlett St. and Figueroa Terrace, Los Angeles. (VII-LA-165-LA), Los Angeles Co., from Jesse S. Smith, Glendale, **$99,720***** plant mix surf., 1.1 mi., El Monte, (VII-LA-77-EMTE), Los Angeles Co., from M. S. Mecham & Sons & Baldum & Peterson, 10861 Drury Lane, Lynwood, **$190,740.** CD 12/15—ENR 12/23.

Louisiana—State Hy. Dpt., Baton Rouge, Jan. 12, grav.-bit. 5.656 mi. State Proj. 213-05-08, Milton-Youngeville Hy., State Rt. 175, Lafayette Parish, from Henry & Hall Dubach, **$168,450.** CD 12/22—ENR 1/2/30, aggregate type base course surf. 6.637 mi. Cecelia-Arnaudville Hy. State Rts. 401 and 356. S. P. 404-03-02, St. Martin and St. Landry Parishes, from Roy M. Lilly, Fidelity Bank Bldg., Baton Rouge, **$258,852.** CD 11 28—ENR 12/2.

January 11

La., Lake Charles—City, City Hall, 16,200 sq. yd. c. con. pavement and 48,000 sq. ft. sidewalk various streets, from Henniken Constr. Co., P. O. Box 634 Shreveport, **$99,-091.** CD 12/23—ENR 12/30.

New Jersey—State Hy. Comm., Trenton, rejected bids Dec. 28, impvy. 0.708 mi. Federal St. FAS Proj. S-80 (2), Camden Co. L. B. **$299,920.** CD 12/30—ENR 1/6, **under LB.**

†Virginia—Pub. Roads Admin., 1440 Columbia Pike, Arlington, Jan. 12, Proj. G 1, Part A, Blue Ridge Parkway, Buncombe Co., from Asheville Contg. Co., London Rd., Biltmore, Asheville, N. C. **$425,510.** CD 12/9—ENR 12/16.

CONTRACTS AWARDED

Kansas—State Hy. Dpt., Dodge City, grading 10.211 mi. S. P. 96-36 F 387 (6), Gredey Co. to L. W. Rexford & Son, Salina, **$106,361;** 6.146 mi. S. P. 508-29 F 437 (3), Ford Co., to C. E. Gray, Emporia, **$107,023.** Bids 1/7. CD 12/29.

Kansas — State Hy. Dpt., Columbus, to Freeto Constr. Co., Inc., Pittsburgh, sheet asph. surf. course 0.314 mi. S. P. 59, 50 U 282 (20), Labette Co., **$50,722;** grading 9.607 mi. S. P. 63-11 F 403 (4), **$153,590;** 2.246 mi. S. P. 26-11 S 648 (1) Pt 1., **$66,814,** both Cherokee Co. Grand total $271,126. Bids 1/11. CD 12/28—ENR 1/6.

Tex., Brazoria—Brazoria Co., Freeport, repairing, reconditioning and drainage on roads, **$80,000;** lateral road constr., **$75,000,** own forces. T. J. Dunbar, Jr., Freeport, co. engr.

Tex., Corpus Christi—E. B. Cole, State Natl. Bank Bldg., asph. paving and waterlines, to J. M. Dellinger, Inc., 2606 Lynch St. **$85,000.** Harry L. Hoag, 1707 Peabody St., engr.

EARTHWORK, WATERWAYS

BIDS ASKED

January 25

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, Lots IV and V Levee and Drainage Structure, Little Rock to Pine Bluff (Head of Pontchartrain Island to Pennington Bayou), Pulaski Co., Serial No. Eng. 03-050-49-29. Extended date. G. R. Schneider, ch. Eng. Div. CD 8/25—ENR 9/2.

January 28

†Pennsylvania—U. S. Eng., 925 New Federal Bldg., Pittsburgh, cable installation for traffic signal light sys. Locks No. 2, Monongahela River, Serial No. Eng. 36-058-49-87. Extended date. CD 1/12.

On or About February 15

†Mont., Fort Peck—U. S. Eng., Fort Peck, safety features, Spillway Gate Structure, Fort Peck, Serial No. Eng. 24-016-49-58.

February 15

†South Dakota—Bureau Reclamation, Dist. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo., six 2x4 ft. pressure gates, 3 gate hoists and misc. metalwork for rehabilitation north and south conduits of outlet control works at Belle Fourche Dam. Spec. 2536.

February 16

†Pennsylvania—U. S. Eng., P. O. Box 1715, Baltimore 3, Md., closures, Units 1 and 3, Williamsport, Serial No. Eng. 18-020-49-52. Extended date. CD 1/4—ENR 1/20.

February 24

†Oregon—U. S. Eng., 628 Pittock Block, Portland, Zone 5, concrete, gravity dam, complete outlet gates and valves, penstocks, trashracks, stilling basin, control house and appurtenant structures on North Santiam River in Sect. 7, T 10S, R5E, W. M., approx. 12 mi. east of Mill City, Serial No. Eng. 35-026-49-333.

About February 28

†Pennsylvania—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 19, Conemaugh Dam and appurtenances, approx. 6 mi. southeast of Saltsburg and 2 mi. northeast of Tunnelton, Indiana and Westmoreland Counties, Serial No. Eng. 36-058-49-89.

On or About April 15

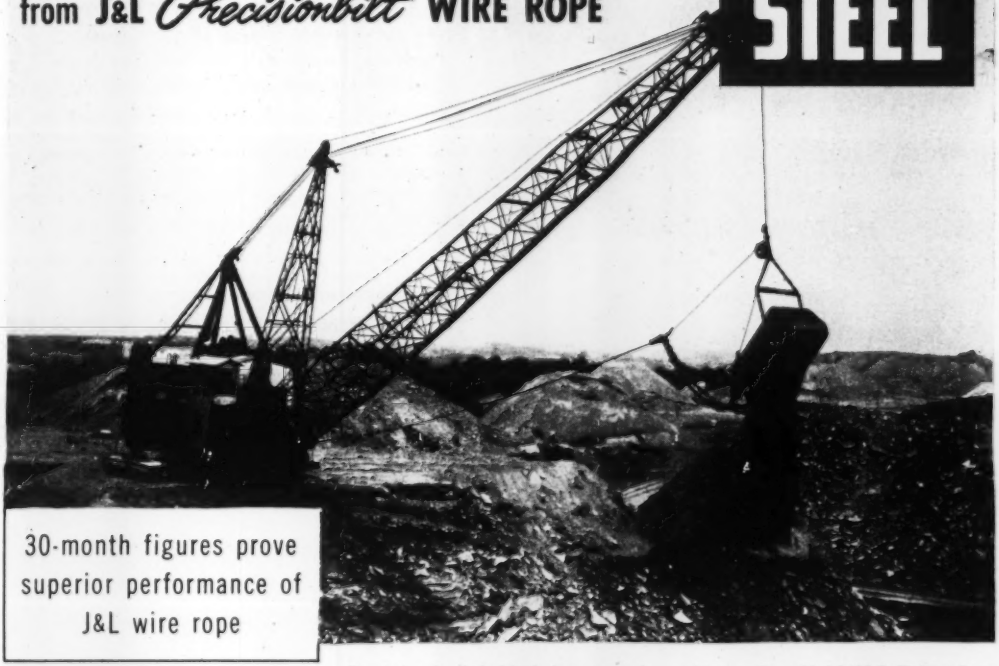
†Florida—U. S. Eng., P. O. Box 1169, Mobile 7, Ala., navigation lock and fixed crest spillway, at Jim Woodruff Dam on Apalachicola River in Jackson Co., Serial No. Eng. 01-076-49-106.

LOW BIDDERS

La., Houma—Terrebonne Parish Police Jury, Houma, Jan. 12, approx. 1,548,000 cu. yd. channel excav., from Montoe J. Wolfe, 10 Beverly Gardens, New Orleans. **$242,266.** CD 12/23—ENR 1/6.

Central Ohio Coal Company* gets L-O-N-G-E-R service from J&L *Precisionbilt* WIRE ROPE

J&L STEEL



30-month figures prove superior performance of J&L wire rope

For two and one half years, Central Ohio Coal Company of Zanesville, Ohio, has kept detailed records on the performance of wire-rope hoisting lines, draglines and dump cables used in their strip-mining operations. These records prove that, among the several different brands used, J&L Wire Ropes gave *more days of service* and moved *more cubic yards of overburden.*

Here are the average performance figures:

Dragline—50% longer service life than competing wire ropes. (J&L Precisionbilt 2¼" dia. Type "U" Lang Lay)

Hoisting Line—30% longer service life than competing wire ropes. (J&L Precisionbilt 1¾" dia. 6 x 37 Lang Lay)

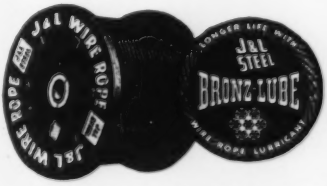
Dump Cable—More than twice the service life of competing wire ropes of ⅛" larger diameter. (J&L CenterFit 1⅛" dia.)

But it is what's behind these records that counts! Both J&L and Central Ohio "know their ropes." J&L knows how to build wire ropes and what type to recommend for every job. Central Ohio knows how to operate them for the longest and most profitable service. This means not only correct application, but also *proper, engineered care.*

—And what is "proper, engineered care?" Why not let a J&L Wire Rope service engineer tell you? He's a specialist in wire rope application. He knows how to get the most out of every inch of hoisting line, dragline, logging rope, marine cable, oil-country line—or wire rope in any other application.

If you would like to have a J&L engineer call on you, write us. The coupon is for your convenience.

Above—*Page, Model 627 S, Walking Dragline, with 12-1/2 yd. bucket. J&L Wire Rope for hoisting line, dragline and dump cable.*



Jones & Laughlin Steel Corporation
428 Jones & Laughlin Building
Pittsburgh 30, Penna.

Gentlemen:

We are interested in learning how to get more service from our wire ropes. Please have a J&L engineer call on us.

Name.....

Address.....

*Affiliated with Ohio Power Company in the American Gas and Electric System.

JONES & LAUGHLIN STEEL CORPORATION

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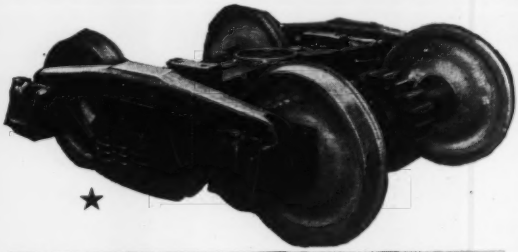

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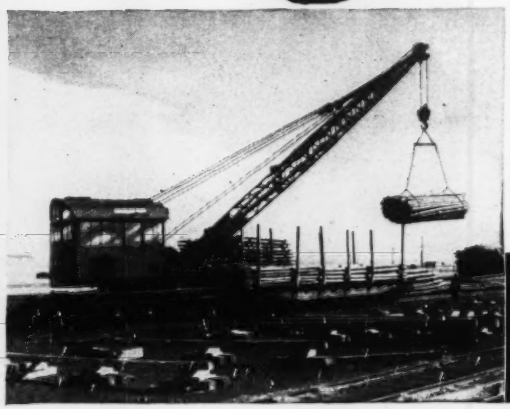
16223 Waterloo Road • Cleveland 10, Ohio



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Saxe System Welded Connection Units for welded assembly

Saxe *Units* place in position and securely hold together structural parts to be welded.

As used in many welded structures they *eliminate all hole punching*, producing an economical, rigid, safe and quickly erected structural frame.

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Canadian Representatives
G. D. PETERS CO., Montreal-2, Canada

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PNEUMATICALLY PLACED CONCRETE
DENSE • DURABLE • HIGH STRENGTH

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Dam, Dock and Bridge Repairs
Steel Encasement and Fireproofing
Sewer, Water Pipe and Penstock Linings
Stack and Bunker Linings
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MURRAY HILL 3-7699

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CLOSING POWER *Plus* WHEN AN OWEN BUCKET *Clamps Down*

It's the "Plus" features in a product that contribute largely to outstanding performance and build user satisfaction and profits.

Relax and swing an Owen from your boom. Closing Power PLUS is there when required for licking the toughest excavating jobs which will confront you.

THE OWEN BUCKET CO. 6010 Breakwater Ave., Cleveland, O.
BRANCHES: PHILADELPHIA • CHICAGO • BERKELEY, CALIF.

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAY'S WORK

†**Ohio**—U. S. Eng., foot of Bridge St., Buffalo 7, N. Y., Jan. 5, dredge 440,000 cu. yd. from Cuyahoga River, Cuyahoga Co., from Great Lakes Dredge & Dock Co., 1630 Williamson Bldg., Cleveland, Zone 14. **$285,560.** CD 12/8—ENR 12/16.

AIRPORTS AND AIRBASES

BIDS ASKED

On or About March 1

†**Minn., Duluth** — UTILITIES—U. S. Eng., 1709 Jackson St., Omaha, Zone 2, Neb., 7,500 lin. ft. 6 in. watermain, valves, appurtenances, 600 lin. ft. 6-to 15 in. drainage pipe, appurtenances, 1,350 lin. ft. 8 in. sanitary sewer line, incl. 6 manholes, 2,000 lin. ft. graded service drives, one 25,000 gal. concrete ground storage tank and pumping equip., Imhoff tank with disposal field and appurtenances, 500 lin. ft. two-way primary and 200 lin. ft. four-way secondary underground duct sys., one 150 kva transformer station. Serial No. Eng. 25-066-49-175. CD 3/17/45—ENR 4/1/45.

LOW BIDDERS

†**Tex., Corpus Christi** — TAXIWAYS—At office Kenneth C. Lovell, officer in charge of Construction, Bureau Yards and Docks, Pub. Wks. Bldg., Naval Air Station, Jan. 10, taxiway repairs and imprvs., from J. M. Dellinger, 2425 Leopard St., **$68,893.** CD 12/3—ENR 1/13.

†**Va., Chincoteague**—AIRPORT BLDGS.—Pub. Wks. office, Headquarters, Fifth Naval Dist., U. S. Naval Base, Norfolk, Zone 11, cancelled bids to have been opened Jan. 28, married officers quarters at Naval Auxiliary Air Station and Naval Aviation Ordnance Test Station, Spec. 18278, NOy 14298. Will re-advertise. CD 1/7—ENR 1/20.

CONTRACTS AWARDED

Mich., Manistee — AIRPORT IMPRVS.—City, City Hall, grading airport, own forces, **$64,000.** Ernest L. Neumann, Manistee, engr.

LATIN AMERICA

Mexico, Nuevo Laredo—Municipal Govt., Junta Federal de Mejoras Materiales, Nuevo Laredo, Tamps, receiving bids February 3, public school and swimming pool and grandstands. Plans deposit $14.55. CD 4/7—ENR 4/29.

PUBLIC BUILDINGS

BIDS ASKED

January 24

Conn., Groton—Town, C. M. Chester, chm. Bd. Educ., Groton, brick, steel 10-room school incl. classrooms, kindergarten, shop and utility room, Prospect St., North Sect. $250,000. Sholfield & Lindsay, 309 State St., New London, archts.

January 28

New York—Bd. Transportation, 250 Hudson St., New York, Zone 13, constructing building foundations for Brook Street Bus Garage, Brook and Pike Sts., Richmond Boro. Contr. MW-105-1.

January 31

Calif., Oroville—Butte Co., Courthouse, 2 story, basmt., rein.-con. Hall of Records Bldg. over $250,000. Plans deposit $25. E. Geoffrey Bangs, 605 Market St., San Francisco, archt.

February 2

†**Mich., Battle Creek**—U. S. Eng., 520 Merchandise Mart, Chicago, Zone 54, Ill., addnl. post exchange facilities, Percy Jones General Hospital. Serial No. Eng. 11-032-49-59.

February 4

Ont., Parry Sound—J. B. Parkin & Assoc., archts., 648 Church St., Toronto, 1 story, 60 x 430 and 60 x 80 ft. concrete school for High School Bd., Parry Sound. $300,000. CD 9/24—ENR 7/8.

February 10

●†**Tex., Bonham**—U. S. Eng., Box 51, Tulsa, Okla., 300 bed domiciliary and 50 bed general medical hospital, Eng. 34-066-49-36, for Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C. $4,000,000. Extended date. CD 11/15—ENR 11/10.

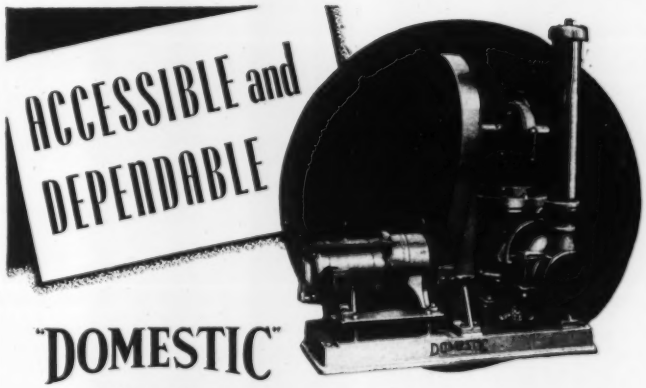
●**Tex., Houston**—Houston Independent School Dist., 1600 Washington St., 1, 2 and 3 story, 138,000 sq. ft. steel frame, rein.-con., brick and hollow tile Negro High School near Finnegan Park, $2,225,000. Plans deposit $50. Stayton Nunn, 2917 W. Gray St. co-ord. archt. MacKie & Kamrath, 2711 Ferndale Ave., Houston, archt. W. P. Moore, 4605 Montrose Blvd. engr. CD 12/1—ENR 12/23.

February 15

Tex., Port Arthur—Port Arthur Independent School Dist., Stephen F. Austin High School addn. $550,000; Tyrrell High School addn. **$500,000.** Plans deposit $25, mechanical $15. Mark Lemmon, 1210½ Main St., Dallas, engr. CD 7/21—ENR 8/5, under LB.

February 16

Ill., Evanston—Evanston Twp. High School Dist., Evanston, 1 and 2 story, brick, concrete,



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Our 44 years of engineering and manufacturing experience assure superior construction and service.

DOMESTIC plunger sludge pumps are today performing herculean tasks in every state in the Union, many after decades of gruelling use.

Types available: 6"—8½"—10" —and 12¼" in single, duplex and triplex types. Capacities from 35 gpm to 375 gpm at heads up to 115 ft. All sizes 5½" stroke, adjustable eccentric type. Furnished with gear head motor and roller chain drive or constant speed motor and V belt drive.

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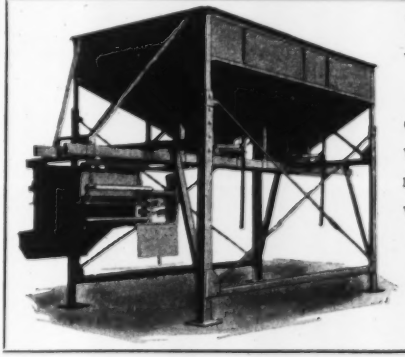

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10S-11S-14S-16S Mixer

Complete—with scale for two or three aggregates.

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SHEARING & STAMPING CO. YOUNGSTOWN 1 OHIO

LONG EXPERIENCE AND EXTENSIVE FACILITIES FOR ENGINEERING AND CONSTRUCTION IN GUNITE

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steel field house, gymnasium and offices. Perkins & Will, 309 W. Jackson St., Chicago, archts.

February 24

Tex., Houston—Houston Independent School Dist., 1609 Washington St., masonry, concrete, steel Berry School, $850,000. Stayton Nunn, 2017 W. Gray St., co-ord. archt. Cameron Fairchild, 2626 Westheimer Rd., archt. W. P. Moore, 4695 Montrose Blvd., engr. Howard, Johnson & Kelley, Scanlan Bldg., mechanical engrs. CD 6/23/47—ENR 7/10/47.

About March 3

+N. J., Buffalo—U. S. Eng., Engineer Park, Zone 7, male attendants' quarters, manager's residence, staff apartment bldg., Veterans Admin. Hospital Proj. Plans deposit $25.

Bids Asked

N. M., Eunice—Eunice School Dist., c/o Supt., 1 and 2 story, brick, tile school addns, altering high school, incl. gymnasium, $525,-000. C. H. Holderness, Carlsbad, archt. Haynes & Kirby, 1302 Dixie Dr., Lubbock, Tex., engrs. CD 10/14—ENR 10/28.

LOW BIDDERS

Calif., Oakland—Bd. Educ., 1025 2 Ave., Jan. 11, 2 story, rein.-con. Redwood Heights School, from John E. Branagh, 105 Sheridan Ave., Piedmont, **$452,777.** CD 12/22—ENR 12/30.

Calif., San Luis Obispo—San Luis Obispo Elementary School Dist., 1 story, steel, wood CE Peach School and Emerson School, to Maino Constr. Co., 2238, S. Broad St., San Luis Obispo, **$344,250.** CD 8/20—ENR 9/2.

Conn., Wethersfield—Town Supt. Schools, 200 Main St., Jan. 10, Stephen Mix Mitchell School and Charles Wright School, from Edward Packter Co., 11 Asylum St., Hartford, **$628,424.** CD 12/16—ENR 12/30.

Ill., Alton—State of Illinois, Springfield, Jan. 6, general work, tuberculosis unit, Alton State Hospital, from R. C. R. Constr. Co., 735 Park Ave., **$296,950.** CD 12/16—ENR 12/30.

Ill., Dixon—State of Illinois, Springfield, Jan. 6, general contract tuberculosis unit, Dixon State Hospital, from R. V. Monahan Constr. Co., 308 W. Washington St., Chicago, **$344,830.** CD 12/16—ENR 12/30.

Ill., Peoria—State of Illinois, Springfield, Jan. 6, general contract tuberculosis unit, Peoria State Hospital, from Wolfes-Jensen & Co., Inc., 127 N. Dearborn St., Chicago, Zone 2, **$358,476.** CD 12/16—ENR 12/30.

+Mo., St. Louis—U. S. Atomic Energy Comm., 65 Destrehan St., Zone 7, Jan. 11, installing mechanical equip. piping, fittings, electrical controls, etc., boiler plant, 65 Destrehan St., from Kreuter Hicks Co., 3974 Delmar Blvd., Zone 8, **$169,650.** Singmaster & Breyer, 65 Destrehan St., Zone 7, engrs.

+Montana—Bureau Reclamation, Dept. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo., Jan. 11, furnishing, del. structural steel roof framing Hungry Horse Power Plant, Hungry Horse Proj., Spec. 2504, from American Bridge Co. First National Bank Bldg., Denver, Colo., **$67,560,** f.o.b. Gary, Ind. CD 12/14—9NR 12/16.

S. C., Georgetown—Bd. Trustees Georgetown, Jan. 12, Georgetown County Memorial Hospital from Southern States Constr. Co., 1211½ Washington St., Columbia, **$329,944.** CD 12/15—ENR 12/30.

CONTRACTS AWARDED

Calif., Ukiah—Mendocino Co., Courthouse, 4 story, rein.-con. jail and courthouse, to Carl N. Swenson Co., Box 558, San Jose, **$714,435.** Bids 1/10. CD 12/22—ENR 12/30.

N. C., Laurinburg—Scotland County Memorial Hospital, Laurinburg, hospital, to McKee-Hedgepeth Co., P. O. Box 23, Greenville, S. C. **$578,000.** Bids 12/17. CD 12/23—ENR 1/6, under LB.

COMMERCIAL BUILDINGS

BIDS ASKED

Early in February

La., New Orleans—Textile Workers Union of America, 4139 Tchoupitoulas St., 2 story, concrete block office, community center and auditorium, 4139 Tchoupitoulas St. John Edwards, 2002 Butler St., archts.

February 1

Tex., Corpus Christi—First Baptist Church Congregation, 801 Mesquite St., church $675,-000. Extended dec. Phelps & DeWees & Simmons, 1501-06 Majestic Bldg., archts. W. E. Simpson, 935 Milam Bldg., San Antonio, engr. CD 12/27—ENR 1/6.

February 2

Tex., Houston—Rice Institute, M. Esperson Bldg., 2 and 3 story 41,000 sq. ft. steel, brick dormitory, $650,000. Staub & Rather, 500 Stuart St. archts. W. P. Moore, 4695 Montrose Blvd., engr. Reg. F. Taylor, Bankers Mortgage Bldg., mechanical engr.

Proposal Advertisements see pp. 171, 172 & 191. Proposed Projects see p. 142

OFFICIAL PROPOSALS

Bids, February 10, 1949 (827)

Furnishing and Delivering Materials for Aqueduct

COMMONWEALTH OF MASSACHUSETTS METROPOLITAN DISTRICT COMMISSION

Sealed proposals will be received at the office of the Metropolitan District Commission, 20 Somerset Street, Boston, Massachusetts, until 1:00 P. M., Eastern Standard Time, Thursday, February 10, 1949, and then publicly opened for Contract No. 165 for furnishing and delivering screens, gate valves, sluice gates, pressure reducing valves, pressure relief valves, air valves, aircocks, a crane hoist, Venturi meters and recorders, compound water meter and recorder, a hydrant and a water level recording gauge for the Chicopee Valley Aqueduct in the towns of Belchertown, Ware and Ludlow, Massachusetts. There are twelve groups of items which may be awarded as a whole or as separate contracts, but no single group will be further subdivided nor awarded to more than one bidder. Each bidder may submit a price on one or more of these groups, but must quote on each item of the particular group or groups bid. Each bidder shall deposit cash or certified check as security in the amount of $250 for Group A, $2000 for Group B, $200 for Group C, $1000 for Group D, $200 for Group E, $200 for Group F, $30 for Group G, $100 for Group H, $500 for Group I, $50 for Group J, $20 for Group K, and $10 for Group L. A bond in at least the full amount of the contract will be required of each successful bidder to secure the faithful performance of the contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. The information for bidders, forms of proposal, contract, and performance bond, and plans and specifications may be examined at the above address, and copies thereof obtained from Karl R. Kennison, Chief Engineer of the Construction Division, upon deposit of $5, to be refunded only to bidders or to others returning them within ten days after the opening of bids. The Commonwealth reserves the right to waive any informality in, or to reject, any or all proposals. No bidder may withdraw his bid within thirty days after the actual date of the opening thereof. A proposal which includes for any item a bid that is abnormally low or high may be rejected as unbalanced.

WILLIAM T. MORRISSEY,
Commissioner

January 13, 1949

Bids: February 1, 1949 (818)

Water Main and Appurtenances

NOTICE TO BIDDERS

SEALED BIDS for hauling approximately 9,300 ft. of 6 inch cast iron water main and appurtenances furnished by the City, and laying the same in various streets in the City of Long Beach, will be received by the City Council of the City of Long Beach at City Hall, Long Beach, N. Y., until 8 o'clock P. M. Eastern Standard Time, on Tuesday, February 1, 1949, and then and there publicly opened and read aloud.

Notice to bidders, forms of proposal and contract, plans and specifications may be examined at the office of the City Clerk during the hours of 9 A.M. to 4 P.M. from Monday to Friday, inclusive.

The City Council of the City of Long Beach reserves the right to waive any informalities in or to reject any or all bids or to accept any bid which they deem to be most favorable to the interests of the City.

Maurice J. Fleischman
City Clerk

Dated: Long Beach, N. Y.
January 10, 1949

Bids: February 15, 1949 (825)

General Construction for Housing Project

SEALED PROPOSALS WILL BE RECEIVED at the office of the Municipal Housing Authority of the City of Schenectady, 402 Millard Street, Schenectady, New York, until 2:15 P.M., Tuesday, February 15, 1949 at which time and place the same will be opened and publicly read by the Municipal Housing Authority of the City of Schenectady, New York.

The sealed proposals are to be for:

Contract No. 5 —General Construction (Entire Project)
Contract No. 5A—General Construction (North Portion)
Contract No. 5B—General Construction (South Portion)
Contract No. 6 —Heating
Contract No. 7 —Electric Work
Contract No. 8 —Plumbing

for Housing Project N. Y. S.—34, Site A, located on the easterly side of Van Vranken Avenue in the City of Schenectady, New York.

The Contract Documents may be examined at the offices of—

F. W. Dodge Corporation, 119 W. 40th Street, New York 18, New York
Brown's Letters, Inc., 101 Park Avenue, New York 17, New York
Albany Builder's Exchange, 372 Hudson Avenue, Albany 6, N. Y.

The Contract documents may be examined at the office of the Municipal Housing Authority of the City of Schenectady, New York, or at the office of the Architects, Karas & van der Bogert, 126 Wall Street, Schenectady, Schenectady, New York, on and after January 15, 1949 and copies thereof obtained upon payment of $25.00 as a deposit to guarantee the safe return thereof. If a Proposal is duly submitted by any person or corporation making the deposit required, the full amount of such deposit for each set will be returned to such person or corporation, provided that the set is returned in good condition within thirty (30) days following the award of this contract or the rejection of the Proposal of such person or corporation.

Checks offered as payment for the documents must be made payable to the order of the Authority.

MUNICIPAL HOUSING AUTHORITY OF THE CITY OF SCHENECTADY, NEW YORK
WILLIAM H. DUNN,
Chairman
JOHN MACGATHAN,
Executive Director

Bids: February 8, 1949 (826)

Postponement of Bid Date

NOTICE TO CONTRACTORS
CONSTRUCTION OF
ADDITIONS TO LEY CREEK
TREATMENT PLANT
ONONDAGA COUNTY, N. Y.

Notice is hereby given that the receiving and opening of bids set for 10 A.M. on January 17, 1949, has been postponed to 10 A.M. E.S.T., February 8, 1949, and separate sealed bids for Additions to the Ley Creek Sewage Treatment Plant will be received for the Onondaga Public Works Commission by the County Purchasing Agent, Room 107, County Court House, Syracuse 2, New York, until 10 A.M. E.S.T., February 8, 1949, and there at said office publicly opened and read aloud for:

Contract 1—GENERAL CONSTRUCTION
Contract 2—PLUMBING
Contract 3—HEATING AND VENTILATING
Contract 4—ELECTRICAL

These contracts provide for the construction of additional units at the existing Activated Sludge Plant (30 mgd capacity), including sludge digestion, gas collection and utilization for power, vacuum filtration; a two story and basement building about 80 by 86 feet; miscellaneous equipment including 30 mgd additional pumping capacity, etc.

Information for Bidders and all Contract Documents may be examined at the said office and copies of the same obtained upon payment of $75.00 for each set. Any bidder who has submitted a bonafide proposal and who returns one set in good condition within thirty days of the date of receiving bids will be refunded his deposit for one set. One-half the deposit for additional sets returned by bidders or non-bidders will be refunded for such sets returned in good condition within thirty days of the date of receiving bids. Bidders may obtain additional copies of the drawings on deposit of $65.00 for each and copies of the specifications, bid forms, etc. upon deposit of $15.00 on which one-half the deposit will be refunded under conditions above noted. Single sheets of the drawings may be obtained for $1.00 each on which there will be no refund.

Copies of the above described Contract Documents may be examined at no expense at the above office of the Purchasing Agent and at the office of the Onondaga Public Works Commission, Room 405, County Court House.

The right is reserved to waive any informalities in the bids and to reject any and all bids.

Onondaga County
By: Robert W. Sollinger
Purchasing Agent

Dated, January 12, 1949.

U. S. Government

Public Roads Administration, Federal Works Agency, January 12, 1949. SEALED BIDS will be received at the office of the Division Engineer, Public Roads Administration, 1440 Columbia Pike, Arlington, Virginia, until 10:00 a.m. E.S.T., February 15, 1949, for the construction of Part A, Project 1L1, Blue Ridge Parkway, Botetourt and Bedford Countries, Virginia. The approximate quantities of the more important items are as follows: 189,400 Cu. Yd. Excavation; 13,400 tons Crushed Gravel or Crushed Stone Base Course and 2,765 Cu. Yd. Stone Masonry. Minimum wage rates have been fixed as required by law. For plans and specifications, a deposit of $10.00 cash or certified check made payable to the Treasurer of the United States, will be required to insure their return within 15 days after the opening of bids. Plans, Specifications and Proposal forms may be obtained at the address given above, or at Public Roads Administration, 410 State and City Office Building, Roanoke, Virginia. H. J. Spelman, Division Engineer.

(823)

Public Roads Administration, Federal Works Agency, January 10, 1949. SEALED BIDS will be received at the office of Public Roads Administration, 115 Nevada St., Hot Springs, Arkansas, until 10 a.m., C.S.T., February 15, 1949, for the construction of Arkansas Forest Highway Project No. B-7-A1, Part 2, Pope County, Arkansas. Length—4.304 miles. The approximate quantities of the more important items are as follows: 128,600 cu. yds. Excavation; 26,000 tons Crushed Gravel or Crushed Stone Base Course; and 2,448 lin. ft. Reinforced Concrete Pipe. Minimum wage rates have been fixed as required by law. For plans and specifications, a deposit of $10 cash or certified check made payable to the Treasurer of the United States will be required to insure their return within 15 days after opening of bids. Plans, specifications and proposal forms may be obtained from the address given above or Public Roads Administration, 1440 Columbia Pike, Arlington, Virginia. H. J. Spelman, Division Engineer.

(824)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2526) will be received by Bureau of Reclamation, Denver, Colorado, until 2 p. m., February 17, 1949, and then publicly opened for furnishing two 10,000-kva, 110-kv power transformers; one 112.5-kva, 13.2-kv distribution transformer; and several power circuit breakers, air switches, disconnecting fuses, and lightning arresters for voltages of 15-kv to 115-kv for Thermopolis substation, Transmission Lines Unit, Wyoming, Missouri River Basin Project. Delivery is desired within 700 days. For particulars, address the Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado, MICHAEL W. STRAUS, Commissioner. (814)

(Continued on page 172)

Official Proposals Columns of ENGINEERING NEWS-RECORD

are MUST reading, each week, for contractors, engineering-construction companies, equipment and materials manufacturers, all over the United States.

. . . and used regularly for over 50 years by government, state, county and municipal departments for advertising bids.

Official Proposal Division
ENGINEERING NEWS RECORD
Address: New York 18, N. Y.

U. S. Government
(Continued from page 171)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2527) will be received by Bureau of Reclamation, Denver, Colorado, until 2 p. m., February 17, 1949, and then publicly opened for furnishing 34.5-kv and 115-kv power circuit breakers and air switches for the Boysen switchyard, Boysen Unit, Wyoming, Missouri River Basin Project. Delivery is desired within 500 days. For particulars, address the Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado. MICHAEL W. STRAUS, Commissioner. (813)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. 2528) will be received by Bureau of Reclamation, Denver, Colorado, until 2 p. m., February 17, 1949, and then publicly opened for furnishing generator-voltage bus structures and neutral grounding equipment for units 1 to 5, inclusive, for Davis Power Plant, Davis Dam Project, Arizona-Nevada. Delivery is desired within 300 to 360 days. For particulars, address the Bureau of Reclamation, Building 1-A, Denver Federal Center, Denver, Colorado.
MICHAEL W. STRAUS, Commissioner. (822)

OFFICIAL PROPOSALS

Bids: February 14, 1949 (821)

Sewage Disposal

DEPARTMENT OF PUBLIC WORKS
Middletown, New York

Sealed proposals will be received by the Board of Estimate and Apportionment of the City of Middletown, New York, at the office of the Commissioner of Public Works until 4:00 p. m. on Februray 14, 1949 for the construction of secondary sewage treatment works at the present municipal sewage disposal plant.

Bids will include the construction of
2—105' diameter stone filters
2—105' diameter clarifiers
1 new digester
2 new enclosed sludge drying beds
pumping station

Alterations to present facilities together with all necessary piping, fitting of concrete structures.

Proposals will be publicly opened and read at 4:00 p. m. February 14, 1949.

Plans and specifications may be examined at the office of the Commissioner of Public Works, City Hall, Middletown, New York. A deposit of $25.00 will be required for each complete set of plans and specifications distributed. No refund will be made.

Proposals shall be made upon the forms provided therefor, in accordance with specifications, copies of which may be secured at the Office of said Commissioner.

The Board of Estimate and Apportionment reserves the right to reject any and all bids and to accept the bid they consider to be in the best interest of the City of Middletown.

By order of
THE BOARD OF ESTIMATE AND APPORTIONMENT
Geary W. Chumard
COMMISSIONER OF PUBLIC WORKS

Bids: February 2, 1949 (812)

State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Chapter 63 Laws of 1936, as amended, and special provisions for projects financed with federal aid funds, sealed proposals will be received until ten-fifty o'clock A.M., eastern standard time on *WEDNESDAY, FEBRUARY 2, 1949* by Henry A. Cohen, Director, Bureau of Contracts & Accounts, *14th* Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects; Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts & Accounts, Albany, N. Y., and at the office of the District Engineers noted below, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for plans and proposal forms for each contract containing 1 to 15 sheets is $5.00; 16 to 30 sheets, $10.00; over 30 sheets, $20.00. A refund will be made in full to bidders for the return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by a cash, draft or certified check payable to the order of "State of New York, commissioner of Taxation & Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders".

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject all bids.

B. D. Tallamy, Supt. of Public Works

County	Contract No.	Name	Miles	Type	Deposit	Cost of Work
		DISTRICT No. 1				
		G. L. Nickerson, Dist. Engr., 353 Broadway, Albany, N. Y.				
Warren	FASS 49-4	Sodom—No. Creek, Co. Rd. No. 29 Proj. No. S223(1)	3.90	I-Beam 41"—8 1/2" Conc. Slab 27' Gravel Surf. Treat.	$16,000 Plans $10.00	$275,000
		DISTRICT No. 2				
		L. Ketchum, Dist. Engr., 109 No. Genesee St., Utica, N. Y.				
Fulton	FAS SH 49-2	Meco—Cork. Pt. 1 Proj. No. S224(1)	1.26	Bit. Mac. Pen. Meth.	$4,500 Plans $5.00	$83,000
		DISTRICT No. 3				
		Wm. Robinson, Dist. Engr., Weigh Lock Bldg., Syracuse, N. Y.				
Onondaga	FG RC 49-4	Separation of Grades D.L. & W. R.R. Lafayette-Onativia, S. H. 9086 Proj. No. FG 470(14)	0.51	Plate Girder 104' Conc. 8" Thk., 24', Var. Wdt.	$23,000 Plans $5.00	$415,000
Oswego	FAS SH49-3	New Haven—Texas, Pt. 1 Proj. No. S233(1)	2.89	I-Beam With Conc. Slab 43' 9" Conc. Frame 24' Conc. 9" Thk. 24' Wdt	$27,000 Plans $5.00	$497,000
		DISTRICT No. 4				
		A. R. Mueldian, Dist. Engr., Barge Canal Terminal, Rochester 1, N. Y.				
Orleans & Monroe	RC 49-5 FASS 49-5	Lake Pt. 2 and Fourth Sect., S. H. 492 S. H. No. 392—Clarendon-Monroe Co. Line Proj. No. S242(1)	7.49	Graded Gravel Double Surf. Treat.	$13,000 Plans $10.00	$229,000
		DISTRICT No. 10				
		J. J. Darcy, Dist. Engr., Montauk Hwy. at Little East Neck Rd., Babylon, L. I., N. Y.				
Bronx	FA CBE 49-2	Cross Bronx Exps. Cont. 8A (Longfellow Ave.—Harrod Ave.) Proj. No. U1084(2)	0.39	6 Brs. Substructures Total Spans, 78'-7 1/2" 1396', 176', 388', 441' 9", 469' Grad. & Structures	$200,000 Plans $20.00	$3,345,000
Queens	FA VWE 49-1	Van Wyck Expressway (Cont. 5B) Proj. No. U1085(10)	0.89	Steel Beams, 2 at 50'-6 1/2" Steel Beams, 2 at 51'-2 3/16" Grading	$110,000 Plans $20.00	$1,910,000

OFFICIAL PROPOSALS

Bids: February 14, 1949 (820)

Storm Sewers

DEPARTMENT OF PUBLIC WORKS
Middletown, New York

Sealed proposals will be received by the Board of Estimate and Apportionment of the City of Middletown, New York, at the office of the Commissioner of Public Works until 4:00 p. m. on February 14, 1949 for installation of approximately 10,700 feet of various size reinforced concrete pipe in the public streets of Middletown, New York together with necessary manholes, catch basins, etc.

Proposals will be publicly opened and read at 4:00 p. m. on February 14, 1949.

Plans and specifications may be examined at the office of the Commissioner of Public Works, City Hall, Middletown, New York. A deposit of $25.00 will be required for each complete set of plans and specifications distributed. No refund will be made.

Proposals shall be made upon the forms provided therefor, in accordance with specifications, copies of which may be secured at the Office of said Commissioner.

The Board of Estimate and Apportionment reserves the right to reject any and all bids and to accept the bid they consider to be in the best interest of the City of Middletown.

By order of
THE BOARD OF ESTIMATE AND APPORTIONMENT
Geary W. Chumard
COMMISSIONER OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: February 1, 1949 (817)

Well and Pumping Equipment

NOTICE TO BIDDERS

SEALED BIDS for the complete installation of a well at Indiana Avenue and Reynolds Channel in the City of Long Beach, N. Y., constructed to the deep Lloyd fresh water at a depth of approximately 1300 feet, complete with electric drive deep well turbine pump unit guaranteed to have a water producing capacity of not less than 1,000,000 gallons daily at a discharge pressure of 60 lbs., will be received by the City Council of the City of Long Beach at City Hall, Long Beach, N. Y., until 8 o'clock P. M. Eastern Standard Time, on Tuesday, February 1, 1949, and then and there publicly opened and read aloud.

Notice to Bidders, forms of proposal and contract, plans and specifications may be examined at the office of the City Clerk during the hours of 9 A. M. to 4 P. M. from Monday to Friday, inclusive.

The City Council of the City of Long Beach reserves the right to waive any informalities in or to reject any or all bids or to accept any bid which they deem to be most favorable to the interests of the City.

Maurice J. Fleischman
City Clerk

Dated: Long Beach, N. Y.
January 10, 1949

Bids: February 1, 1949 (819)

Toll Collection Equipment

MYSTIC RIVER BRIDGE AUTHORITY
Suite 325-329, Six Beacon Street
Boston 8, Massachusetts

NOTICE TO CONTRACTORS: Sealed bids or proposals for Contract No. 9-B will be received by the Mystic River Bridge Authority at its office, Six Beacon Street, Boston 8, Massachusetts, until 12 noon, February 1, 1949, and at that time publicly opened and read. The equipment to be furnished and delivered includes toll booths and toll registering equipment and accessories for fourteen (14) traffic lanes at the Toll Plaza and Administration Office of the Mystic River Bridge. Specifications may be obtained at the office of Charles A. Maguire and Associates, 16 Cornhill, Boston 8, Massachusetts, or of J. E. Greiner Company, 1201 St. Paul Street, Baltimore 2, Maryland, on payment of $7.50 which is not returnable. Proposal guaranty shall consist of a certified check for six thousand dollars ($6,000.00) payable to the order of Mystic River Bridge Authority. The successful bidder will be required to furnish a bond for the faithful performance of the contract in the full amount of the contract. Attention is called to the minimum rate of wages to be paid on the work as determined by the Commissioner of Labor and Industries under the provisions of Chapter 161 of the Acts of 1935. Complete information may be obtained from the Authority. Right is reserved to waive any informality in or to reject any or all proposals.

MYSTIC RIVER BRIDGE AUTHORITY
By Ephraim A. Brest, Chairman
Date Jan. 10, 1949.

(Continued on page 191)

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)
$1.20 cents a line, minimum 4 lines. To figure advance payment count 5 average words as a line.
POSITIONS WANTED (full or part-time individual salaried employment only). ½ the above rates, payable in advance.
PROPOSALS, $1.00 a line an insertion

INFORMATION:
BOX NUMBERS care publication New York, Chicago or San Francisco offices count as 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅛ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by January 25th appear in February 3rd issue subject to limitations of space available

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED—ENGINEERS, Architects, Draftsmen experienced in the design of sewers, sewage treatment plants, water treatment plants and industrial buildings. Also engineers to supervise construction. State qualifications, experience, salary requirements and date available. P-1155, Engineering News-Record.

WANTED—STRUCTURAL Engineer. Capable of designing simple structures in steel and reinforced concrete. Applicant must have several years of experience. Opportunity for top position. Give full details, salary and date available. P-7606, Engineering News-Record.

WANTED: EXPERIENCED structural and industrial designers. Seelye, Stevenson & Value, 101 Park Avenue, New York, N. Y.

WANTED: ESTIMATOR for general Contractor operating in eastern seaboard. Must be well skilled in quantity take-off of all items except mechanical. Chance for advancement and earning interest in business for right man. Give full particulars and references. P-7692, Engineering News-Record.

TWO GRADUATE construction engineers for highway construction work in Alaska. Must have had at least ten years experience in responsible capacity in bituminous and concrete highway construction, be familiar with and capable of directing all phases of highway construction and inspection. Salary $7,500.00 per year, plus travel expenses. P-7729, Engineering News-Record.

BRIDGE ENGINEER, experienced in design of steel highway bridges, must be qualified to design and detail plate girder and truss spans and floor systems. Two to three year's work. Location: Alaska, salary: $9,000. P-7728, Engineering News-Record.

CHIEF ENGINEER for manufacturing plant in Philadelphia district. Architectural background desirable, but not essential. State age, experience and salary in first letter. P-7744, Engineering News-Record.

STATISTICIAN, FOR construction price records, charts, indexes, interpretation, writing. Civil engineering training helpful but not essential. Office in New York City. Write P-7734, Engineering News-Record.

COST ESTIMATOR or engineer with writing ability for statistical department, national construction publication with offices in New York City. Write P-7732, Engineering News-Record.

CHIEF ENGINEER or Superintendent to Design a plant to manufacture Ammonia. Must have actual experience on this type of plant. Salary $10,000.00 a year, reply Industrial Design and Engineering Co., St. Louis, Mo.

STRUCTURAL DESIGNER. Unusual opportunity for experienced designer familiar modern highway, bridge, and industrial building practice, to take charge of going organization. Give full details in first letter. P-7600, Engineering News-Record.

WANTED: MAINTENANCE supervisor to act as assistant to Maintenance Superintendent; experience in heavy chemical industry essential; must have ability to get along with workers under Union contract, and be capable of supervising and instructing workers on machine repairs, proper pipefitting methods, and welding. Modern plant in West Virginia; excellent working conditions; stable employment. P-7760, Engineering News-Record.

PAVING SUPERINTENDENT

EXPERIENCED

Excellent opportunity to become general superintendent for large construction company. Permanent position and location.

Furnish all details—Age, experience, references, salary, education.

P-7598, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

WANTED

2 Structural detailer—checkers

Permanent jobs for good men with experience in all types of bridge and building work.
Moving expenses will be paid by the Company to men who qualify.
Apply by letter giving resume of experience, also salary desired.

PAXTON & VIERLING IRON WORKS
P.O. BOX 1085 OMAHA, NEB.

ENGINEERS WANTED

Architectural, Civil and Other Specialties are urgently needed by the City of Detroit to prepare plans, specifications and drawings and to supervise and inspect construction on a wide variety of municipal projects. Salary ranges from $3139 to $5048 a year for a 40 hour week. For information address the

DETROIT CIVIL SERVICE COMMISSION
13th Floor, Water Board Building,
Detroit 26, Michigan

WANTED—Mechanical and Structural Engineers For designing and detailing work on concrete reinforcement, structural steel and hangar door construction. Requirements are three to four years practical experience or recent graduation from technical school. Desirable working conditions and opportunities for advancement. These openings are with a nationally known steel fabricating company, located in eastern Ohio. Applicants will please submit a record of their qualifications. P-7737, Eng. N-R, 520 N. Mich. Ave., Chicago

A-1 ESTIMATOR WANTED

By firm located in Boston, Mass. Must be experienced in estimating on all types of buildings and able to prepare quantity surveys for concrete, masonry, carpentry, excavation, utilities, etc. Good salary.

Apply by letter, stating experience, references, and date available. All replies will be held strictly confidential.

P-7743, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

SALARIED POSITIONS $3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (39 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, Inc., 272 Dun Bldg., Buffalo 2, N.Y.

POSITIONS WANTED

STRUCTURAL ENGINEER, 33, college graduate, registered in N. Y. Thoroughly experienced in the design of all phases of steel timber and concrete construction. Eight years industrial plant structures, four years general field and office engineering. Presently employed at good salary by major chemical corporation. Desire change for position of responsibility with opportunity for advancement or affiliation. PW-7685, Engineering News-Record.

CONSTRUCTION MANAGER thoroughly experienced in field and office management, estimating, purchasing, expediting, engineering architecture, cost accounting and construction methods desires connection with general contractor southern location preferred. PW-7690, Engineering News-Record.

STRUCTURAL DESIGN Engineer, Graduate C.E., Age 45, 23 years experience designing steel, concrete and timber structures, together with any type of foundation. Thoroughly competent to execute complete structural designs on any type building or waterfront structure, and supervise the execution of working drawings. Correspondence invited for position of responsibility. PW-7208, Engineering News-Record.

PROJECT MANAGER or General Superintendent on heavy construction project in United States. Fifteen years experience on both engineering and construction of highways in west and middle west. Experienced administrator. Project manager on three million highway project past six months. Civil Engineer. Experience includes construction of docks, seawalls, and pipe lines. Available about February 1. Present salary $12,000. PW-7483, Engineering News-Record.

ENGINEER—EXECUTIVE ability, presently District Sales Engineer, experienced design, sales, field service heavy steel forms, batching plants, concrete mixers and paving machinery, desires connection with manufacturer or contractor in responsible capacity. PW-7497, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT, Project Manager, or Job Superintendent. Over 15 years experience as such, in practically all types of Industrial, Commercial, and Governmental construction work. Excellent references. Available in Jan., 1949. PW-7510, Engineering News-Record.

SUPERINTENDENT 18 YEARS experience in concrete, dams, foundations, sewers, tunnels and buildings. Also steel sheathing and piling. Will go anywhere. PW-7559, Engineering News-Record.

BUILDING CONST. Manager; 28 years experience. Thoroughly understands estimating, pricing, sub-letting, purchasing, supervision and office routine. PW-7564, Engineering News-Record.

CARPENTER FOREMAN, 28 years exp. in every branch. Can lay out work. Have limited Engineer experience. N. Y. C. or vicinity. PW-7735, Engineering News-Record.

(Continued on page 174)

A COURSE OF INSTRUCTION BY MAIL IN

STRUCTURAL ENGINEERING

Thirty-seventh Year

(In the following list, Courses A, B, and C are abbreviated from our complete Structural Engineering course).

A—Public Works Structures.
B—Architectural Engineering.
C—Special Course (State Board Exams. for P.E.)
D—Structural Engineering (complete).
E—Preparatory Course (for non-technical men).

Our Courses are offered principally to
ADULT CIVIL ENGINEERS AND ARCHITECTS

Ninety percent of our engineering students are former graduates (C.E.) from engineering colleges. Our courses have helped thousands of engineers to better positions, increased pay, and success "after forty".

Course B has helped many architects and draftsmen in passing the structural portion of State Board Examinations for license.

Literature sent without expense or obligation. Deferred payments permissible. Write TODAY.

WILSON ENGINEERING CORPORATION
College House Offices Harvard Square Cambridge, Mass., U. S. A.

AVAILABLE
SUPERINTENDENT or ASSISTANT SUPT.
Graduate Civil Engineer, 38 years of age, long experience in heavy construction such as, oil refineries, chemical plants, industrial buildings, airports and Military Bases, dams and flood control projects, and mass concrete. Know Government requirements. Have worked both foreign and domestic.

PW-7677, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

POSITIONS WANTED

(Continued from page 173)

CIVIL ENGINEER, university graduate, license N. Y. & N. J., over 20 years of excellent experience as project manager and designer on industrial buildings, hydro-electric developments, bridges, hangars, airports, etc., office and field. Interested in responsible position here or abroad, where initiative, resourcefulness and background are needed. PW-7722, Engineering News-Record.

CONSTRUCTION ENGINEER—general superintendent, capable organizer large commercial, industrial projects wants connection with contractor where ability can find full play. Long successful record. Exceptional references —available at once. PW-7712, Engineering News-Record.

ENGINEERING, BUSINESS Background-civil eng. graduate; 2 years structural design experience with consulting engineer; graduate work in Business Admin.; 24, veteran, single; desires position to combine technical, business and personal abilities. PW-7755, Engineering News-Record.

FIELD OFFICE man twenty years experience auditing, accounting detail. Location immaterial. PW-7768, Engineering News-Record.

SPECIFICATIONS WRITER—Graduate Engineer, seven years experience in all types heavy construction contracts. PW-7804, Engineering News-Record.

SELLING OPPORTUNITIES WANTED

SALES REPRESENTATIVE available. Experienced direct factory representative of heavy construction and earth moving equipment wishes to form a new connection. Experienced in the appointing and handling of distributors as well as direct selling. Good executive and excellent background. Best of references. Well acquainted in eastern part of country. Now employed but could be available shortly. RA-7762, Engineering News-Record.

SALESMAN, 40, experienced in construction and industrial machinery, present territory maritime provinces and Newfoundland. First class personal ability and business references. Available March 15th. SA-7711, Engineering News-Record.

SALE OR Promotion of equipment or product by engineer with wide acquaintance in northeast area among engineers, architects, contractors and industrials in the chemical, oil, utilities and railroad fields. Successful sales record and background of shop and construction experience. Salary and bonus or commission arrangement. SA-7753, Engineering News-Record.

PATENT ATTORNEY

Patent Practice
before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommel, Registered Patent Attorneys, Suite 454, 815-15th Street, N.W., Washington 5, D. C.

Napoleon once said
"An Army Marches on Its Stomach"
We Have Fed Millions
KANE INDUSTRIAL SERVICE
Industrial Feeding.
Labor Camps.
Labor Camp Equipment.
Free Employment Agencies.
30 Years' Experience in the Housing and Feeding of Men for Satisfied Clients.
Abundant Labor Supply available for Large Projects Anywhere.
VALENTINE B. KANE & ASSOCIATES
1410 State St. New Haven 11, Conn.

WE HAVE
SHOVELS, BULLDOZERS & GENERAL CONSTRUCTION EQUIPMENT
WE SEEK
JOINT OPERATING ARRANGEMENT WITH CONSTRUCTION CONTRACTOR Needing Such Equipment
BO-7625, Engineering News-Record
330 West 42nd St., New York 18, N. Y.

FOR SALE
Contracting business, road building, land clearing, excavating, etc.
Completely equipped with good machinery, now operating.
Write P. O. Box 713 Little River Sta. Miami, Fla.

FOR SALE
Heavy Construction Co.
Land Clearing, Road Building, Excavating
$30,000.00 in signed contracts
Inventory value only
Addressee 2265 S.W. 28th St. Miami, Fla.

WANTED
ORGANIZATION OR INDIVIDUAL
possessing excavating and grading equipment, by newly organized contractor with plenty of "know how." Partnership on job basis desired. N.Y.C.
B.O. 7746, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

FOR SALE
2,000 (Approx.)
LANDING STRIP MATS
17" x 10'
F.S. 7003, Engineering News-Record
330 West 42nd Street, New York 18, N. Y.

LEARN TO ESTIMATE

Today, more than ever before, you must know how to analyze building costs. If you want to become a successful builder, learn how to prepare a correct estimate in a hurry. Get in on the profitable work now available wherever you turn. Your success is assured if your estimates are right; otherwise you are licked before you start.

The Tamblyn System of Estimating will make a real estimator out of you in a few weeks of your spare time. We are so sure that you will want to learn it, that we will send you our complete home study course for ten days examination absolutely free. If you don't think it is the finest thing you ever saw, just return it and it won't cost you a cent. If you like it and want it, send us $8.75 when 10 days are up and $7.50 per month until $38.75 is paid.

This estimating system is based on forty years of actual construction experience. It has been sold all over the world for more than twenty years. Thousands of estimators and contractors swear by it. Our offer isn't hot air and big talk. We don't give you a diploma or a lapel button, but we do teach you down to earth estimating which will bring you profitable business.

Just send your name and address today, and we will mail you the complete course at once for your approval.

TAMBLYN SYSTEM
1115 So. Pearl St., E-252
Denver, Colo.

When Writing Your Ad

Provide an indexing or subject word.

Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column.

The right is reserved to reject, revise or properly classify all Want Advertisements.

Proper Classification
increases the possibility of
Prompt Returns

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OFFERS

AIR COMPRESSORS

Worthington two-stage, water cooled, vertical 250#, 60 CFM, new condition.
Gardner-Denver, 105 foot, with air receiver, hose reel, driven by power take-off and mounted 1941 Ford.
Gardner-Denver air-cooled 105 foot with receiver, V-Belt driven from power take-off and mounted on 1942 Ford chassis with Wood two-yard dump body.
Gardner-Denver two-stage 160 ft., skid mounted.
Worthington 210 cubic foot, two-stage air-cooled, on steel wheels with Hercules diesel.
Chicago Pneumatic 210 cubic foot, two-stage, air-cooled, Caterpillar diesel on four rubber tired wheels.
Gardner-Denver 315 cu. ft. two-stage, skid mounted, Murphy four-cylinder diesel.
Pennsylvania 12" x 10" class 3A single cylinder, 355 cubic foot P.D., flat belt driven, 50 HP slip ring motor.

QUARRY EQUIPMENT & BINS

18 x 36 Farrell deep jaw crusher, with McLanahan 3' x 7' roll type feeder.
10 x 20 Champion No. 4½ primary jaw crusher
10 x 7 Allis Chalmers Blake type jaw crusher.
Williams 20-S pulverizer.
100 ton 3 compartment storage or aggregate bin with or without batcher and scales.
60 ton 2 compartment storage bin with clam shell gates.

ELECTRIC MOTORS

New & Rebuilt—All Sizes
3 to 125 HP in stock
Open and Totally Enclosed

TRUCKS—TRAILERS

1½-ton Ford & Chevrolet.
2½-ton GMC. New and rebuilt.
Van Trailers with 17'x7'8"x6' bodies. Five ton capacity.
2,000 gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.

GASOLINE AND DIESEL ENGINES

New JXD Hercules Gasoline.
Buda, Hercules, Hill diesels, rebuilt.
New Murphy 4 and 6 cylinder diesels.
GM 6 and 12 cylinder diesels, practically new.
New Cummins 6 cylinder diesels for Euclids.

DIESEL GENERATORS

7½ KW to 125 KW. Alternating and direct current.

SHOVEL

Osgood 1¾-yd diesel powered shovel with 23' boom, 17' dipper stick, 1¾-yd dipper D13000 diesel engine. Excellent condition.

SHOVEL ATTACHMENTS

Lorain 30A chain crowd, LBS#5142, 16' boom 13'4" stick ½-yd dipper.
Lorain 40 cable crowd, LBS#3989, 18' boom 14'4" stick ¾-yd dipper.
Lorain 40 Hi-Lift, 25' boom 19'8" stick LBS#5877, new ¾-yd dipper LBS#7750.
Lorain 40 chain crowd, LBS#4395, 16' boom 14' stick ¾-yd dipper LBS#7433.
P&H 203A, LBS#2527, 19'6" boom 13' stick ⅜-yd dipper.
Bucyrus-Erie 30B tunnel front 9' stick 1½-yd dipper LBS#3392.
Koehring 502 with necessary parts to convert from crane to shovel, 21' boom 16' stick 1¼-yd dipper.

DRAGLINE FAIRLEADS

New Osgood ½-yd Model 200.
Rebuilt Lorain 40, ¾-yd, LBS#6860.
New Lorain 40, ¾-yd, LBS#7459.

BACKHOE BUCKETS

¾-yd Lorain, 40, LBS#6105, 44" cutting width, teeth, sheave.
27" outside width drop bottom type LBS #1033, good condition.
26" outside width solid bottom type LBS #4377, good condition.

NEW TAGLINES

McCaffrey Model 636 for ½ to 1¼-yd crane.
McCaffrey Model 648 for 1¼ to 2-yd crane.

SHOVEL DIPPERS

Lorain 27, ⅜-yd. LBS#4658.
Lorain 27, ⅜-yd. LBS#4912.
Bucyrus-Erie 20B, ¾-yd. LBS#3801.
Lorain 41, ¾-yd, LBS#7433, new condition.
New Lorain 41, ¾-yd, LBS#6225, teeth, bail.
New Lima 1-yd, Amsco, LBS#2295.
Bucyrus-Erie 1¼-yd gas air, LBS#3782, fair.
Lorain 75 manganese 1¼-yd, LBS#7233, teeth & bail.
Lorain 75B, 1¼-yd. extended lip, 1¾-yd. LBS#2260.
Pettibone-Mulliken 2-yd Lorain 82 or 820, manganese, LBS#5381.
Pettibone-Mulliken 2-yd for 3500 Manitowac LBS#6153.
Pettibone-Mulliken 2-yd for 3500 Manitowac LBS#5763.

CONCRETE ROAD BUILDING & MISCELLANEOUS CONCRETE HANDLING EQUIPMENT

Pavers & Mixers

Ransome 34E dual drum, new October, 1943, with 36'9" boom, 1000 gallon auxiliary water tank, Cummins engine, rebuilt.
Jaeger Model 14DL, non-tilt mixer, rebuilt.

Concrete Finishers

Jaeger type "L" double screed, 10½'-12½' rebuilt.
Heltzel 10'-12' finisher, rebuilt.
Blaw-Knox gas-electric 10½'-12½', rebuilt.
2 Koehring 10'-12', rebuilt.
Koehring 10'-16' finisher, rebuilt.

Concrete Spreaders

Blaw-Knox type SA 10'-15' spreader new 1943. New condition.

Concrete Road Forms

790'—Truscon 7"x8" forms, with stakes.
2450'—Heltzel 7"x8" forms, with stakes.
4290'—Blaw-Knox 8"x8" forms, with stakes.
2030'—Heltzel 10"x8" forms, with stakes.
1760'—Blaw-Knox 10"x8" forms, with stakes.

Fine Grade Machines

Flynn surgrader 10'-12', rebuilt.
R.B. Fine Grader for 21' width, rebuilt.

Form Graders—2 of each

Cleveland formgrader, new condition.
Carr formgrader, new 1944, rebuilt.

BELT CONVEYORS

New 18"—24"—30"—36"
- "Sealed-for-life"idlers
- Lattice or channel frame
- Shipment from stock depending on length

CLAM—DRAG—SCRAPER BUCKETS

GRADERS

Caterpillar 44 hydraulically operated drawn grader, 12' blade, wt. 8,300 lbs.
York Corporation Model SR drawn grader with scarifier, 8' blade, rakes, pneumatics, wt. 7,900 lbs.

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"FD" Cletrac with Buckeye blade and double drum P.C.U.

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Buc-Erie 120B, 5 yd. Elec. Shovel.
Buc-Erie 120B, 5 yd. Steam Shovel.
Bay City 65, Gas Shovel, 1¼ yd.
Buc-Erie 22B Dragline, Diesel.
P&H 1225 2½ yd. Electric Shovel.
Northwest 80 2½ yd. Shovel-Dragline.
Lima 1201 Diesel Drag. 3½ yds.
P&H 855B 2 yd. Diesel Shovel.
Link-Belt K-580 3½ yd Shovel-Drag.
Link-Belt K 375 Crane-Dragline, Diesel.
Marion 362, 1¼ yd. Diesel Shovel.
Marion 37 Electric Shovel 1¾ yds.
Marion 90 steam crane-pile driver.
Northwest 6, 1¼ yd. Diesel Shovel.
Northwest 6 Diesel Drag. 1¼ yds.
Buc-Erie 37B, 1½ yd. Diesel Shovel.
Buckeye 70 ¾ yd. Diesel Shovel-Drag.
Lorain 40, 15 ton Truck Crane.

ROAD CONTRACTORS EQUIP.

Finisher Koehring Long. 20'—24'.
Finisher Blaw-Knox 10'—12'.
Port, 500 CFM Diesel Air Compressor.
Rooter 5½ ton LaPlant-Choate.
Blaw-Knox Concrete Spreader, 20'x24'.
Cat. 12 road grader 9K series.
Rooter LaPlante Choate 3 tine RP.
Road Forms 8'60 ft. 9"-20". Other sizes.
Cat. No. 11, Motor Patrol Grader.

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B-G Bit, Concrete Model 848 Mixing.
Cedar Rapids "Speedline".
Cedar Rapids Portable 20 Ton per hr.
Cedar Rapids 4000# Model E Portable.

Complete Plant Liquidation - Spot Delivery

SHOVEL:

Bucyrus-Erie Model 54B 2½ yd. Diesel Shovel.
Koehring Model 304 ¾ yd. Shovel, Diesel powered. New 1948.

CRANE:

Bucyrus-Erie Model 15B crane, new 1943, in rebuilt condition.

TRACTORS:

Caterpillar D8, 2U series, about one year old, with D.D.P.C.U. and angledozer blade.
Caterpillar D8, SR series, D.D.P.C.U. and angledozer blade.
International TD18, with LeTourneau double drum unit. New in late 1946.
Allis-Chalmers HD14C, equipped with D.D.P.C.U. and pusher block. New July, 1947.
Allis-Chalmers HD-19H with angledozer blade. New July 1948.
Int. TD18 with Heil angledozer Trail Builder with D.D.P.C.U. New Nov. 1947.

GRADERS:

Warco Motor Grader, new September 1947.
Adams Motor Grader, new September 1947.
Austin-Weston 99H New Nov. 1948. Int.-UD14 Diesel Engine.

EUCLID REAR DUMP TRUCKS:

Model 31FD New January 1946. **Model 27FD** New April 1946.
Model 27FD New April 1946. **Model 27FD** New November 1946.
NOTE: Must be sold as ONE UNIT.

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4 LeTourneau Super C Tournapulls with LaPlant-Choate scrapers.
3 LeTourneau 10 yd. Rock Wagons.

AIR COMPRESSORS:

2 Ingersoll-Rand 315 cu. ft. compressors, gas operated, new June 1946.

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2 Ingersoll-Rand Model 5M2 Wagon Drills. New June 1946.

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B-K 105 tons Agg. bin, 200 bbls. Cement Bin. Complete with Weighbatchers.
Butler complete ready-mix concrete plant 105 ton Agg. Bin 300 bbl. bulk cement bin.
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Butler 300 ton 3 comp. bin has 1 compt. for 400 bbls. cement, complete with weighbatcher, bucket elevator, etc.
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Adnun Black Top Paver 10'-12'.
Pumpcretes, 160-180-190-200.
Ransome stationary Concrete Mixer 84S.
Multiffoot 27-E, paver, rebuilt.
Rex 34E Dual Drum Paver.
Koehring 28-S Mixer. Gas Operated.
Rex 34E dual drum Paver. Like new.
Rex 27E Paver. Good condition.

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Derrick & Hoist 75 tons stiff leg.
American Terry stiff leg 50 tons 90' bm.
American Terry, stiff-leg 10 tons, 75' bm.
Ketler 25 ton Guy, 100 ft. mast 90' bm.
Insley Guy 20 tons, 115' mast, 90' bm.
Wiley 20 ton Steel Stiff leg, 60' boom.
Steel Guy 25 tons 110' mast, 100' bm.
Steel Guy, 35 tons, 125' mast, 115' bm.
Steel Stiff-leg 25 ton, 3 drum Elec. hoist.

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110-315, 420, 603, 1,000 Ft. I-R Diesels
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1300 ft., 1572 & 2826 & 5011 Ing. Rand Elec.
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1 Yd., P. & H. 600 50' Boom Crane
8—45 Ton & 25 Ton Cap. 100 Ft. Boom Whirleys with or without Gantrys, Steam Elec., Diesel
2 Yd. Monighan 60' B. Elec. Dragline
16 Yds. 160 Ft. Boom Elec. Dragline
1½ Yd. 42B Bucyrus Steam 50 ft. Boom Crane & Shovel
1½ Yd. P. & H. Model 700B Dragline & Shovel
1—7 Yd. Cap. Marion Diesel Dragline
1—6 Yd. Cap. B.E. Monighan Diesel Dragline

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24 x 30 Portable 50/75 Ton Per Hr. Cap.
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36 x 48 Traylor Jaw Crusher
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136 TUNNEL CARS ½ Yd., 2 Yd. & 4 Yd. Cap.
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STEAM: 14x12, 9x10, 8½x10 & 7x10
ELECTRIC: 30, 40, 60, 80, 100, 125 & 150 H.P.
GAS & DIESEL: 15, 40, 75, 90, 110 & 140 H.P.

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25 Ton American Steam & 3—20 Ton Ohio
35 Ton Industrial Brownhoist, Diesel
50 Ton Industrial Brownhoist, Steam

LOCOMOTIVES

33—Steam—40, 60, 110 & 220 ton
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16 Ton Vulcan Std. Ga. Gas.

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5—27E & 34E Dual Drum Pavers
16—¾, 1, 2 & 3 Yd. Mixers

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9—McKiernan-Terry No. 1, 3, 5, 6, 7, 9B3, 10B3
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5 VULCAN 50c & 80c Hammers
Vulcan Model 5000 Super Hammers
3 United Model 1A & 1½A Hammers

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140—Flat Cars 30-40, 50 ton
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60—40 Ton Cap. Box Cars
126—8000 & 10000 gal. Tank Cars

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1¼ Yd. 41B Bucyrus Steam
1—17 Yd. Cap. Bucyrus Erie Elec. Shovel
2—10 Yd. Cap Marion Elec. Shovels
1— 8 Yd. Cap. Marion Elec Shovel
1— 5 Yd. Cap. Marion Elec. Shovel
1— 4 Yd. Cap. Marion Diesel Shovel
5 STEAM SHOVELS—3½, 5, 6 & 8 YD.
2—4 Yd. Marion Elec.

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5 Ton Steel Stiff Leg 40 Ft. Boom
2—Clyde 15 Ton Stiff Leg 100 & 125' Boom
2—Terry 25 Ton 100' Boom Guy Steel Erectors
3—7-10 Ton Guy 85' & 70 Ton 100'

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36—1/3, ½, ¾, 1 Yd., 1½ & 2 Yd.

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CONWAY Muckers 20A, 30A, 50A, 60A & 75
18 Battery Locomotives, 3, 5, 6, & 8 ton
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Angledozer on Cat 50	Pioneer 12"x14" feeder	Unit ⅝ yd. shovel
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For rent.—15 current model Bay City cranes, shovels and backhoes.

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COMPRESSOR: Schramm 420 electric, capacity 450 CFM, 75 H.P. motor. V Belt drive.

1—Schramm portable, 315 ft. capacity, diesel powered.

DRAGLINE: 4 yd. capacity, 110' boom, 2200 volt, A.C.

DRAGLINE BUCKET: Page 4 yd., medium duty, complete.

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2—Loomis Clipper Blast Hole Drills with 6" bits and tools, gasoline powered.
1—Bucyrus Erie 29T with 9" bits and tools, gasoline powered. NEW
1—Diesel powered.
1—Bucyrus Erie 42T, diesel powered, with 9" bits and tools.

BOILER: 100 H.P., 100 lbs. pressure, complete with oil burner and control equipment. Portable.

BUCKET: Haiss 1 yd. digging bucket. NEW condition.

PUMP: Worthington 40 H.P. steam driven Centrifugal Pump, 300 lbs. steam pressure, 3550 RPM, with steam regulator; complete, in new condition.

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1—Piece 1014 ft.
1—Piece 1017 ft.
1—Piece 268 ft.
6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover, on original reels. ALL NEW NATURAL RUBBER: with or without mechanical parts.

MOBILE CRANES:
1—Lima Paymaster mounted on 10 wheel, 6 cylinder Mack, all dual drive; new motor in truck; crane arranged with 80' boom and jib, will lift 18 tons.
1—Byers Truck Crane mounted on 4 cylinder AC Mack truck, 4 wheel, dual drive.

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1—Northwest model 25, capacity 12 tons, 75' boom, 30" treads, Chrysler motor. Has special boom hoist for steel erecting.
1—Link Belt Speeder Crane model 75 with 50' boom and ¾ yd. shovel equipment, gasoline powered.
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GYRATORY CRUSHERS:
1—30" with manganese concaves, V-belt drive, with or without 125 H.P., 440 volt motor; capacity 250 tons per hour to 3".
1—42" complete with motor and drive.
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1—82 Lorain Diesel Combination Shovel and Crane. 1942
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1—80 Ton Lima type 0-6-0 Switcher. New 1944

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1—1½ yd. Link Belt Model K360, Ser. No. 1959, powered by Model 6WAKH Waukesha Hesselman Diesel engine with 65' boom. Also have back hoe attachment, boom 25', scoop arm 8'9", pull shovel mast 11'9", with 1½ yd. dipper.
2—1¼ yd. #5 Northwests, Ser. Nos. 4564 and 3427. Powered with 6 cyl. Wisc. Model D84 and Twin City Model TA gasoline engines. With 50' and 60' booms.
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WE OWN 15 CRANES NOT SHOWN ON THIS LIST. SEVERAL CRANES LISTED ARE IN OUR RENTAL DEPT. ONLY.

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70—NEW Banco oil burning vertical salamanders, 16" square at bottom x 53" high. With outside temperature at zero, will maintain a temperature of 40 deg. F. in a 45,000 cu. ft.

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8—Stiffleg derricks, 1—62½ ton Insley 54' mast, 50' boom, 12-30 ton BRAND NEW Wiley derricks; 30' mast, 60' booms, 1—15 ton All Steel derrick, 25' mast, 20' boom. 2—4 ton Ingrams, 27' x 8" mast, 50' boom.

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2—20 ton NEW American Hoist & Derrick Co. Mdl. 2-100, steel erectors guy derricks, 122' masts, 100' booms, 16' bullwheels. Complete.
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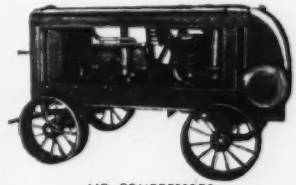

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Owen clamshell buckets, ½, ¾, 1¼ yd.
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½ yd. shovel attach. for Bucy-Erie 15B
⅛ yd. shovel attach. for Byers 71W
Shovel attach. for 41 Bucy.-Erie
20 ton Browning loco. crane 50' boom.
25 ton Browning loco. crane 50' boom.

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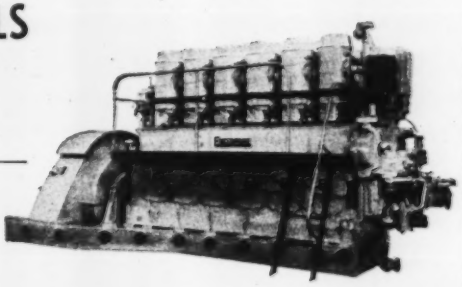

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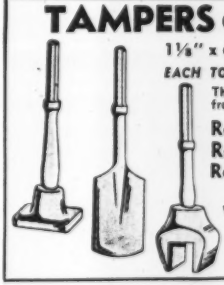

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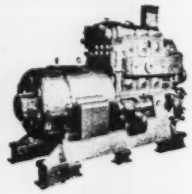

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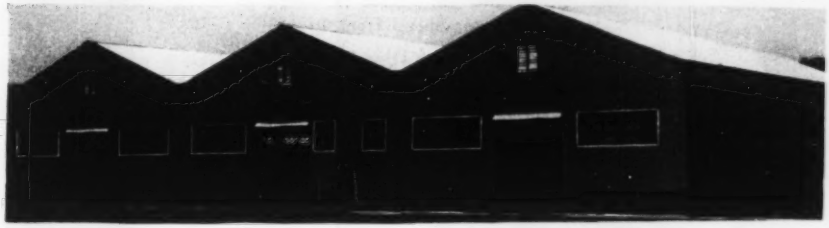

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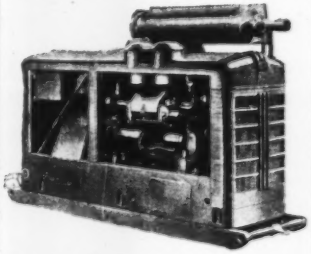

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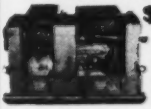
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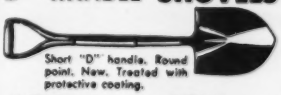
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Digs 27"—30" wide—5' 4" Deep
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OFFICIAL PROPOSALS
(Continued from page 172)

Bids: February 1, 1949 (816)

State Road Work

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

BLOOMFIELD AVENUE

Construction of Bloomfield Avenue from State Highway Route #6 to a point 200 feet West of Passaic Avenue, in Caldwell Township and Borough of West Caldwell, Essex County, Federal Aid Secondary Project No. FAS-883(1). Length 0.98 miles

Estimated:
19,296 cu. yds. Roadway Excav.-Earth
4,304 cu. yds. Subbase
27,271 sq. yds. 8" Concrete Base Course
27,741 sq. yds. FA-BC-2, 3" thick
3,132 lin. ft. Drainage
38 units Catch Basins
1,911 lin. ft. Granite Curb

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Tuesday, February 1, 1949, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME) and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

NOTE: The proposed project is a "Federal Aid Secondary Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements and by Sections 2, P. L. 584, 75th Congress and Sections 2, 3 and 4, P. L. 521, 78th Congress, and is to be performed in accordance with the special provisions and requirements of the Federal Works Agency Public Roads Administration, as outlined in the specifications, which provisions require that labor be employed from lists furnished by the State Employment Service, 600 Bloomfield Avenue, Bloomfield, N. J. The attention of bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all unskilled labor employed on this contract shall be 65¢ per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be 75¢ per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.25 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the Standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner.

OFFICIAL PROPOSALS

Bids: February 1, 1949 (815)

State Road Work

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

ROUTE 81B, SECTION 1A, OVERPASSES

Construction of Overpass at Plaza Road and Overpass at Erie R. R. (Berdan Avenue), on Route 81B, Section 1A, in the Borough of Fairlawn, Bergen County, Federal Aid Project No. U-189(2). The principal items of construction are:

Estimated:
5,431 cu. yds. Concrete in Structures
158,514 lbs. Rein. Steel in Structures
638,342 lbs. Structural Steel

Bids for the above will be received at the office of the State Highway Department, Room 102, State House Annex, Trenton, N. J., on Tuesday, February 1, 1949, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

NOTE: The proposed project is a "Federal Aid Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements and by Sections 2, 3 and 4, P. L. 521, 78th Congress, and is to be performed in accordance with the special provisions and requirement of the Federal Works Agency, Public Roads Administration, as outlined in the specifications, which provisions require that labor be employed from lists furnished by the State Employment Service, 219-229 Ellison Street, Paterson, N. J. The attention of bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all unskilled labor employed on this contract shall be 65¢ per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be 75¢ per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.25 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 102, State House Annex, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: Spencer Miller, Jr.
State Highway Commissioner.

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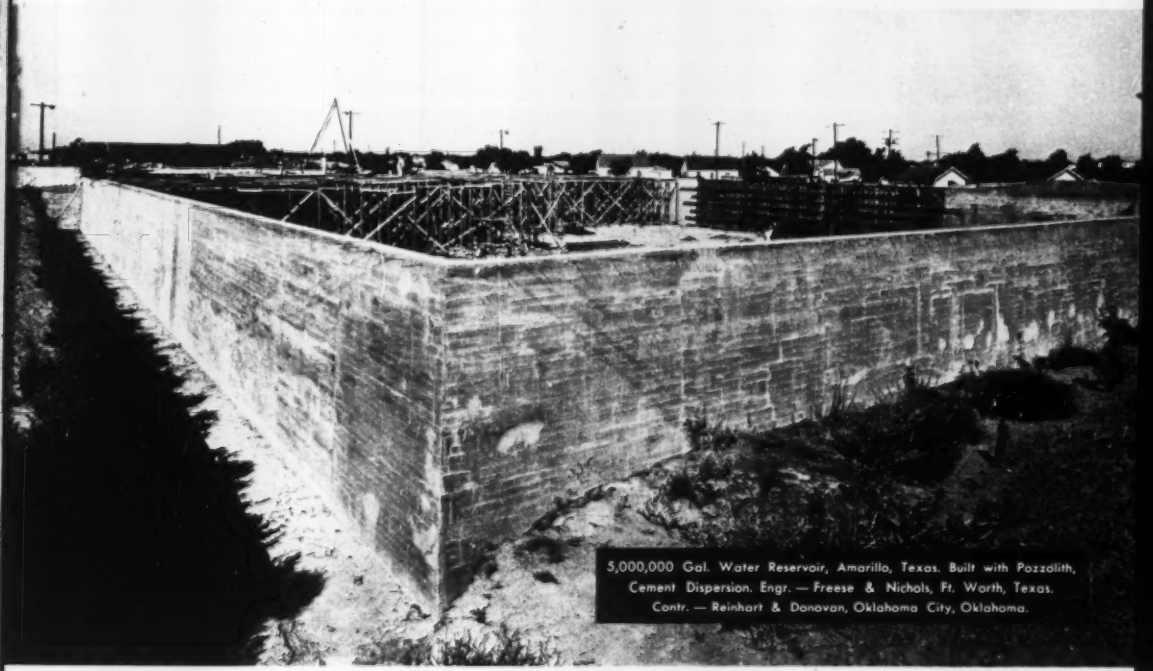

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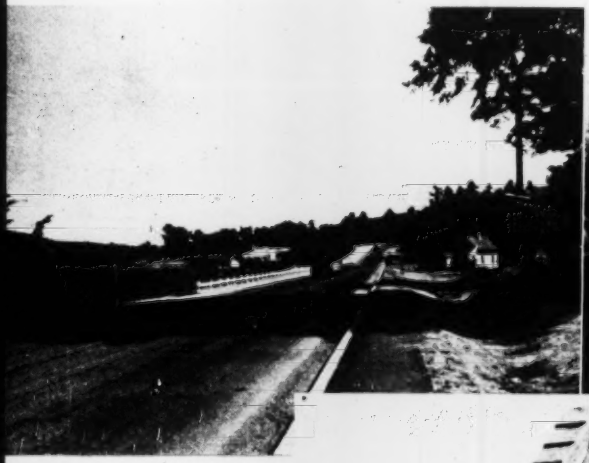

U. S. Route 3, Meredith, N. H. Texaco RC-4 Cutback Asphalt and crushed gravel were mixed by traveling-plant in the construction of this resilient, skid-resistant surface.

Route 12, Keene, N. H. Same type of Texaco Asphalt construction as at Meredith, except that broken stone was used as aggregate, instead of crushed gravel.

Traveling-plant picks up aggregate at left, coats it uniformly with Texaco Cutback Asphalt and discharges mix at right. W. H. Hinman, Inc., of North Anson, Me., was the contractor on both the Meredith and Keene projects.

During 1948 for the first time, New Hampshire employed the traveling-plant method in surfacing two sections of its state highway system. Texaco RC-4 Cutback Asphalt was used as binder in both projects, with broken stone in one case and crushed gravel in the other. Results obtained were so satisfactory that the state plans to use the same type on other sections of its highway system.

Briefly, aggregate was placed in a windrow on the road by spreader box. The traveling-plant picked up the aggregate, coated it thoroughly and uniformly with Texaco Cutback Asphalt, then discharged the mix in a second windrow. The mix was bladed evenly over the road and rolled to a compacted thickness of 3 inches. A gallon of Cutback Asphalt per square yard went into the mix, plus $\frac{1}{4}$-gallon for seal-coating.

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